

wheel loads on poor track and light rails may be increased two or even three times.

"(3.) What are the principal advances that the N. Y. C. & H. R. R. R. has made in track standards in the last ten or fifteen years?"

"Answer: Raising the standard of maintenance by labor; changing from the system of opposite to alternate joints; more efficient ballasting, particularly stone ballast; heavy rails of the greatest stiffness per weight

New Ten-Wheel Freight Locomotives, Class "Q" Mexican Central Railroad.

We illustrate the new Class "Q" freight locomotives of the Mexican Central Railroad, designed by Mr. F. W. Johnstone, Superintendent of Motive Power and Machinery.

Ten of these engines have been built by the Rhode Island Locomotive Works and delivered to the Mexican

pressure of 180 lbs. The firebox is 120 in. long, 31½ in. wide at the grate and 70 in. from the bottom of the mud ring to the under side of the crown sheet. The total heating surface is 2,000 sq. ft. and the grate area is 26 sq. ft. It will be seen that the firebox is very long and narrow, and that the heating surface per foot of grate area is in excess of ordinary practice. The tender used with these engines is of large capacity, providing for 4,500 gals. of water and 8 tons of coal.

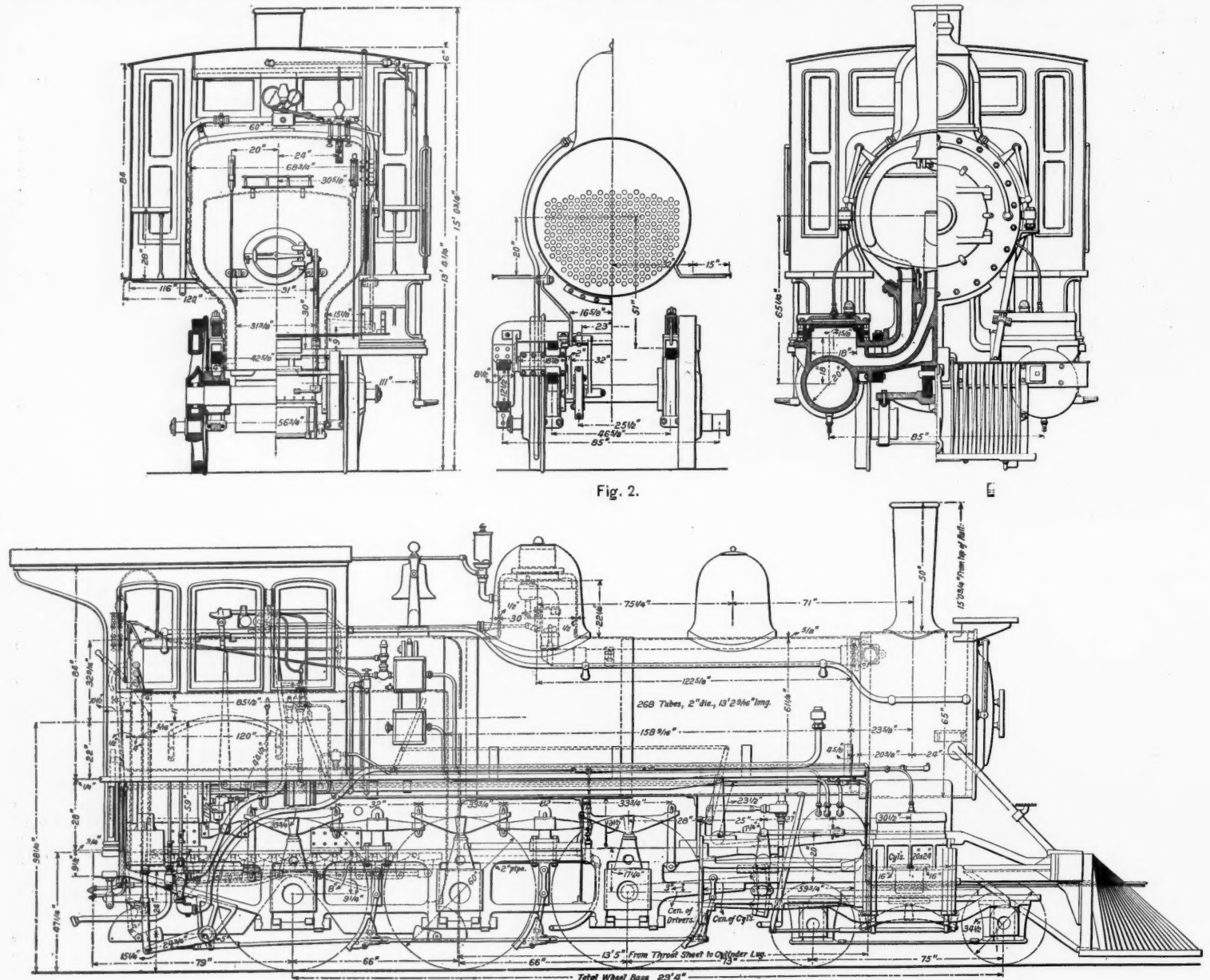


Fig. 1.—Ten-Wheel Freight Locomotive, Class Q—Mexican Central Railroad.

of metal of any in use; hard and tough steel rails of high elastic limits; requiring better hotbed treatment and finish of rails by the mills; the adoption of the three-tie supported joints; the square-necked, steel track bolt; high grade of steel in the splice bars.

"That the three-tie supported joint is superior to the two-tie, suspended joint, we have had ample opportunity and experience to prove on the same section of 80-lb. rails and under the same traffic. On the two-tie, suspended joints, the 22-in. splice bars wore rapidly near the center, the receiving ends of the rails cutting out on the top, the trackmen not being able to hold the surfacing from year to year, the rails taking a set, deteriorating rapidly with each year of service. With the three-tie, supported joint (splice bars 36 inches long), the wear of the splice bars is but little faster in the center than elsewhere, and our trackmen under the same service have been able to maintain the joints and hold a uniform surface of the track for several years. This service is under our fastest and heaviest trains.

"(4.) What effect does speed have on the cost of maintenance of track?"

"Answer: Theoretically it increases it, but practically it depends so much upon the stiffness of the rails and standard of track that the cost of maintenance decreases rapidly as the standard rises. With our standard of maintenance on our 80 and 100 lb. hardrails, we find that the standard of track has improved from year to year under our fast trains, the labor being less per mile than that required on our 65-lb. rails some years since.

"(5.) What effect does increased speed have on the discipline and morale of the men in the track department, as well as in the transportation department?"

"Answer: It has increased their alertness and efficiency in a very marked manner. The trackmen have now become so skilled that they can surface the rails to their full value, the smoothness of the track depending more upon the condition of the steel than the men. We must look quite as much to improved surface rails as to the trackmen for better surface tracks."

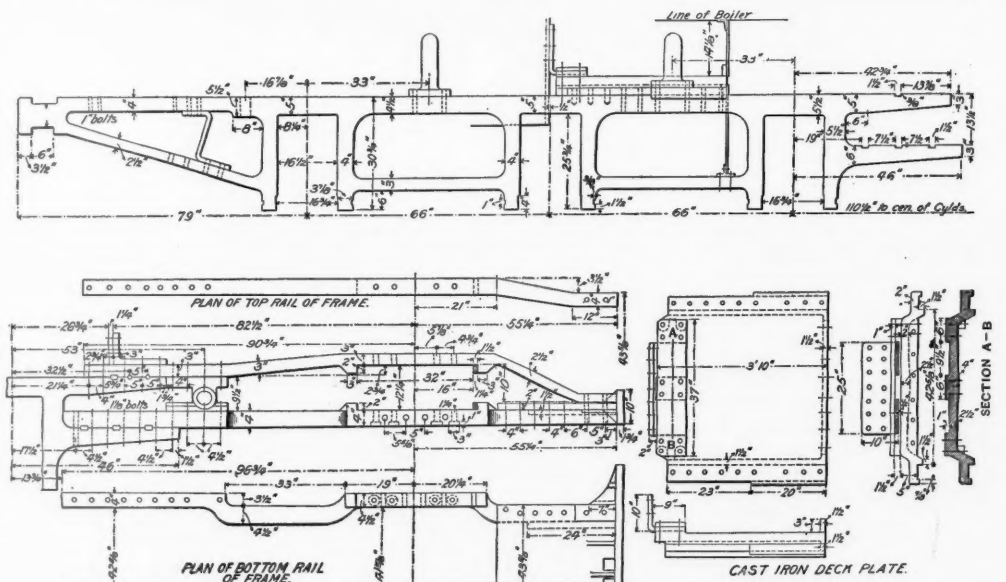


Fig. 5.—Details of Frame—Mexican Ten-Wheel Freight Locomotive.

Central, five having drivers 56 in. in diameter and five with 60-in. drivers.

As will be seen from the drawings, these engines are of the simple 10-wheel type, with cylinders 20 in. in diameter by 24 in. stroke, and have a driving wheel base of 11 ft. The weight on the drivers is 107,000 lbs., while the total weight in working order is 137,000 lbs.

The boiler is of Otis steel, of the Belpaire type, and is unusually large, measuring 61½ in. in diameter at the front end of the barrel, and carries a working steam

In the arrangement of details these engines possess many novel features.

In Fig. 1 is shown the elevation drawing, while Fig. 2 shows sections taken at various points.

In connection with the detail drawing of the boiler, Fig. 3 shows a method of supporting the crown sheet not in common use. This consists in the use of crown bolts with a cap nut on top of the outer shell and a button head under the crown sheet, with a separating piece between the sheets, formed of 1½-in. gas pipe. The holes

in the crown sheet are reamed to fit the taper of the bolt under the head, a $\frac{1}{8}$ -in. copper washer under the cap nut forming a steam-tight joint.

This system of staying the crown sheet has been in use on the Mexican Central Railroad for several years, and

and that the steel cabs were no warmer for the engineer and fireman than the wooden ones.

With the exception of the pilot and pilot beam, no wood is used in the construction of the engines and tenders.

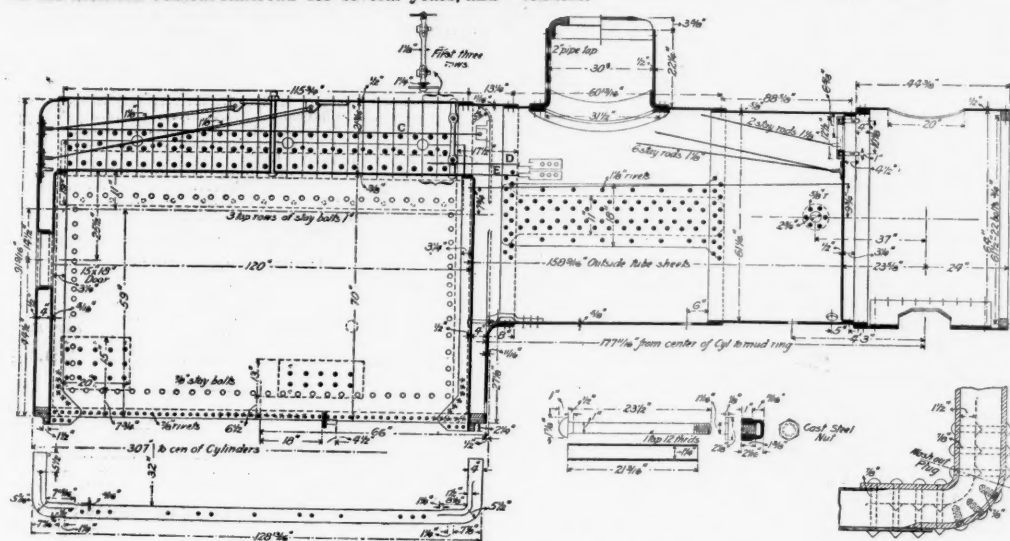


Fig. 3.—Detail of Boiler—Mexican Central Freight Locomotive.

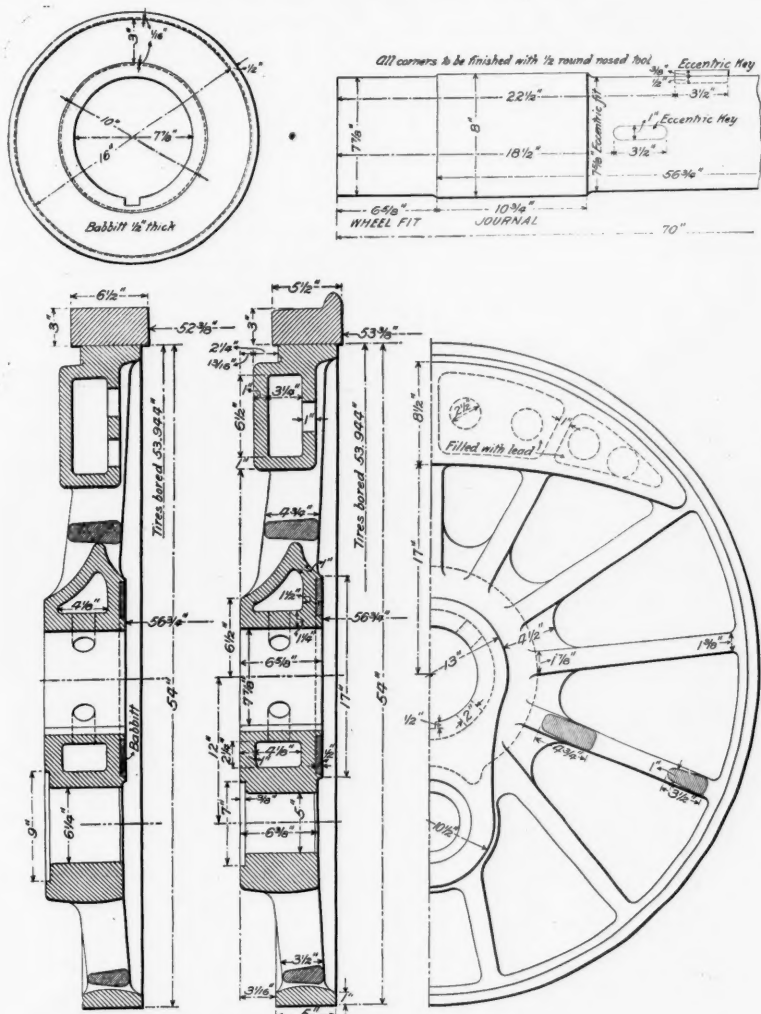


Fig. 7.—Sections and Elevation of Drivers.

has given perfect satisfaction. These stay bolts have, as yet, never broken, but should one give away or become unserviceable on account of leaking, in districts where very bad water is used, it could be removed and a new one put in with very little trouble or loss of time.

The construction of the mud ring is peculiar, and no deck plate is used back of the firebox. The crown sheet and outer shell are not flat but arched, the middle ordinate being 3 in., and the stays radial. The first three rows from the sling sheet are sling stays.

No lagging is used on the boiler. The jacket is made of No. 14 gage, black iron and painted. Spacing strips consisting of 2-in. channel irons are put around the boiler to receive the jacket, which is bolted together at the top and bottom with $\frac{1}{2}$ -in. bolts, passing through $\frac{1}{2}$ -in. angle iron flanges.

The space between the jacket and boiler, inside the cab, is filled with felt or other non-conducting material to add to the comfort of the engineer and fireman. This jacket, has been found to last as long as the engine and it can be readily taken off and replaced when necessary to make repairs on the boiler. There is nothing to catch fire and blister the jacket. The cab is built wholly of steel. It was first considered necessary to have a raised roof, but experience showed it was not necessary

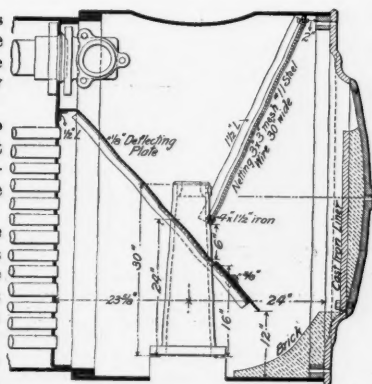


Fig. 4.—Smokebox—Mexican Central Freight Locomotive.

Fig. 4 shows the arrangement of the front end. It will be seen that there is a very moderate extension front. The deflecting plate throws the gases against the brick arch, in the lower corner of the smoke-box, which

directs them through the netting. This device is not patented and for its successful working it is necessary that the netting and deflecting plate fit properly around the steam pipes and on the inside of the arch. This arrangement steams freely and entirely prevents the throwing of sparks when fitted up in proper shape and kept in good order.

In the engine frame, Fig. 5, the jaws are made parallel and provided with shoes, front and back, no wedges being used. The bottom end of the pedestal jaw is held in position by two $1\frac{1}{2}$ in. bolts passing through wrought-iron clamps back of each lug of the jaw with a cast-iron filling piece between the inside faces of the pedestal jaws.

This device has been in use on the Mexican Central for the past seven years and it is found to be a much better arrangement than the old jaw strap which has to be upset and refitted every time the engine goes into the shop for general repairs. With this arrangement no bolt holes are cut through the frame.

It will be noted that the upper and lower rails of the frame are shaped to clear the front truck wheels. The cast-iron deck plate is firmly bolted to the main frames, just in front of the leg of the boiler, and in front of the cylinders the deck plate is introduced at the end between the upper and lower frames.

Experience with large engines with no deck plate back of the firebox has demonstrated the necessity for some such arrangement as here shown, to prevent the working of the frames, which cause them to work loose on the cylinders, and the cylinders to work loose on the smoke arch. This arrangement, by strengthening the frame, prevents leaky steam pipes and reduces the liability of broken frames. It has been used on heavy locomotives, on the Mexican Central, for the past year and a half with marked success.

The cylinder details are given in Fig. 6. As shown, the steam pipes are secured to the cylinder castings by three bolts at the lower end of each pipe. These bolts have a "T" head, and keys are used instead of nuts. This greatly facilitates renewing bolts on removing and replacing them when necessary.

The cross-heads are of cast steel with the wearing sur-

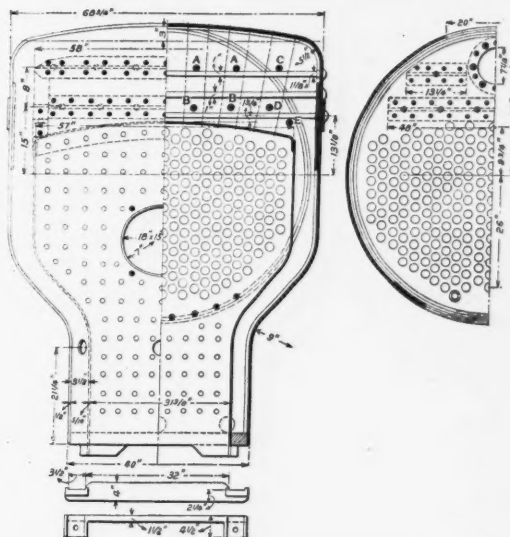


Fig. 3a.—Sections Through Firebox and Smokebox.

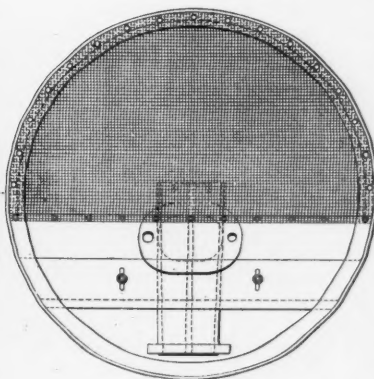
face babbited and run on cast-iron guides. The bottom guide is oiled from a cup which is screwed into a bracket bolted to the side of the guide, the oil feeding up to the surface of the guide. This arrangement takes the cup off the cross-head and puts it where it is less apt to get loose and fall off. The cross-heads are made as far as possible in one piece, so as to have nothing to get loose and give trouble. No gibs are used.

A section of the main driving wheel center and a section and elevation of the center for front and rear driving wheels, is given in Fig. 7. These centers are of cast steel with the inside of the hubs babbited. The counter balance provides for 75 per cent. of the reciprocating parts and all of the revolving parts.

The side rods have solid ends, front and back with a strap on the main rod, but no key is used with this strap, the lost motion being taken up, when necessary, by shimming. The main crank pins are 6 in. in diameter by 6 in. long and the pins for the side rods are $6\frac{1}{4}$ in. in diameter by 4 in. long. All pins are of hammered iron and not case hardened.

The driving-box and driving-box saddle are shown in

Fig. 8. The driving-box saddles are made with full width of bearing on the foot of the saddle, $\frac{1}{8}$ in. wide and 11 in. long. This greatly increases the life of the saddle and prevents its getting out of plumb by the



dence before the Commission, and then, on taking a case to the courts, giving additional evidence. The court seems to have been inclined to the view that under the fourth section the Commission ought to consider competition as one of the elements in deciding cases, though it did not give so full an expression on this point as had been hoped for. Parts of this decision have been quoted by lower courts to sustain the view that the Commission cannot fix rates, but it is believed the Supreme Court had reference only to fixing rates *without notice or hearing*.

The Brown case, compelling unwilling witnesses to testify, is briefly reviewed. This and the decision in the Brimson case in 1894, are believed to have removed most of the difficulty formerly experienced in securing testimony. This being the case the proposition to abolish the imprisonment penalty of the law is opposed by the Commission.

Reference is made to the Grand Rapids free cartage case, the Southern rate war injunction, the Chicago stock-yard case, the Nebraska elevator case and the decision in the suit against the Joint Traffic Association. There are now pending in the courts 22 civil cases to enforce regulating orders of the Commission and 64 to compel the filing of annual reports. Criminal proceedings have been had during the year in New York, Kansas, Pennsylvania, Illinois and Wisconsin.

The tariffs filed by the railroads are still unsatisfactory, although there has been some improvement; and Congress is asked to authorize the Commission to control the contents and arrangement of tariffs.

The number of cases on the docket of formal proceedings during the year has been 45, involving 529 roads. Notes of each of these cases are given in the full report, as also of investigations held during the year at Wash-

Chicago for eight to ten cents less than was charged to Chicago on grain grown in Missouri and Iowa. The roads at one period undertook to make low open tariff rates from the Missouri River to Chicago, but this was met by one line making a lower rate by combining proportions of different through rates. Secret concessions were made to operators of elevators by payment of commissions or by affording exclusive shipping facilities, one railway mentioned being in the hands of receivers. Another plan followed by one carrier was the buying of grain for itself through a "development company," and agents employed to act as shipper and consignee. It was testified that no one could ship grain to Chicago without loss except those who received these advantages. On one road one firm "had the rate," and on another road another firm had it, and all other grain-buyers could do was to "scalp a commission" out of those who "had the rate." An agreement between the competing railroad managers entered into Oct. 12, 1895, and called the "Union League Club Agreement" is discussed, one of the purposes of which was to "fix the percentages of traffic to be allowed to the respective lines." "Violation of this agreement having been charged, another meeting of railway representatives, held in June at Chicago, is mentioned, where one of the lines was allowed \$45,000 by the others to settle its claims for loss of traffic, and the "League agreement" was reaffirmed. This was done notwithstanding the line so compensated had been carrying nearly all the corn from Kansas to Chicago."

The next chapter is on Railroad Associations, in which the commendation of the useful features of such associations by the Commission in the past years is recalled, and the condemnation of the alleged unlawful features is repeated.

Mileage payments on private cars have been investigated by the Commission, 349 roads reporting the amounts paid for such cars during the last fiscal year. This investigation is detailed in an appendix to the report.

On April 1, 1896, 80 per cent. of the locomotives in the country had driver brakes; of the passenger cars 97 per

6. To permit the Commission to appoint special agents with authority to inquire into the business management of carriers.

7. To provide for the interchange of traffic between connecting roads and the continuous carriage of freights from point of shipment to place of destination, as contemplated by sections 3 and 7 of the act.

8. To require carriers to file reports with the Commission each year on or before Sept. 15, with a cumulative money penalty for non-compliance; to make the provisions authorizing the Commission to prescribe a uniform system of railway accounts more specific, and failure to conform to such a uniform system prescribed by the Commission a misdemeanor; to require the carriers to file monthly reports of earnings and expenses.

9. To require that joint tariffs shall specify the names of the carriers parties thereto, and that each of said carriers, other than the one filing the tariff, shall file with the Commission such evidence of concurrence or acceptance as may be required by the Commission; to authorize the Commission to prescribe and from time to time change the form, contents, and arrangement of the schedules and joint tariffs required to be published and filed.

Three-Phase Transmission Plant at Itasca, Wis.

An interesting though small three-phase power transmission plant has been installed at Itasca, Wis., about four miles southeast of Superior, the division headquarters of the Chicago, St. Paul, Minneapolis & Omaha Railroad. In the operation of the shops, roundhouses and store-rooms at Superior the railroad utilizes power for an average of 12 hours a day, but steam is kept up the entire 24. About a mile and a quarter from Itasca extensive docks have recently been built, on which a warehouse 1,500 ft. long and 300 ft. wide has been constructed. Boats are loaded and unloaded on one side of the dock, while tracks are laid the entire length of the opposite side and the cars can receive or deliver the freight at any point in the warehouse.

The protection of the warehouse from fire was one of the first considerations after the building had been constructed and, naturally, the first plan was to purchase a steam plant and pump. The attention of the railroad company being called to the numerous power transmission plants which had been installed by the General Electric Co., they decided to adopt the three-phase system of transmission instead of providing for an independent power station. The work has been completed and a 750-gallon pump is driven by electric power and the incandescent and arc lamps which are used in the warehouse, the shops, roundhouse and other buildings at Itasca, are all lighted by current from the power plant of the railroad.

A G. E. 100 K. W. three-phase generator, at a voltage of 2,000 volts, provides the current. This high voltage was adopted in order to do away with the necessity of step-up transformers. This dynamo at the superior end of the line is driven at a speed of 900 revolutions per minute by a 110-H. P. Ball & Wood engine. The accompanying engraving shows the pumping plant, which consists of a 75 G. E. 2,000-volt induction motor coupled to a Gould double-acting pump having an output of 750 gals. per minute, operating at 80 lbs. pressure and sufficiently large to throw four streams upon the docks and into the warehouse.

There are five fire stations in the warehouse which are fitted with electric fire alarm apparatus for transmitting signals between the docks and the engine-house. Also switches distributed through the building which connect the motor and the pump to the wires which transmit the power. Hydrants and reels are suspended from the walls, each reel having 100 feet of hose, so that after the fire signal has been given from the engine house one man can carry hose and water to the fire in from 10 to 30 seconds. A fire corps has been organized, and the men are drilled three times each week.

The tests which have been made upon this plant have shown very satisfactory results, and the saving in operating expenses is considerable.

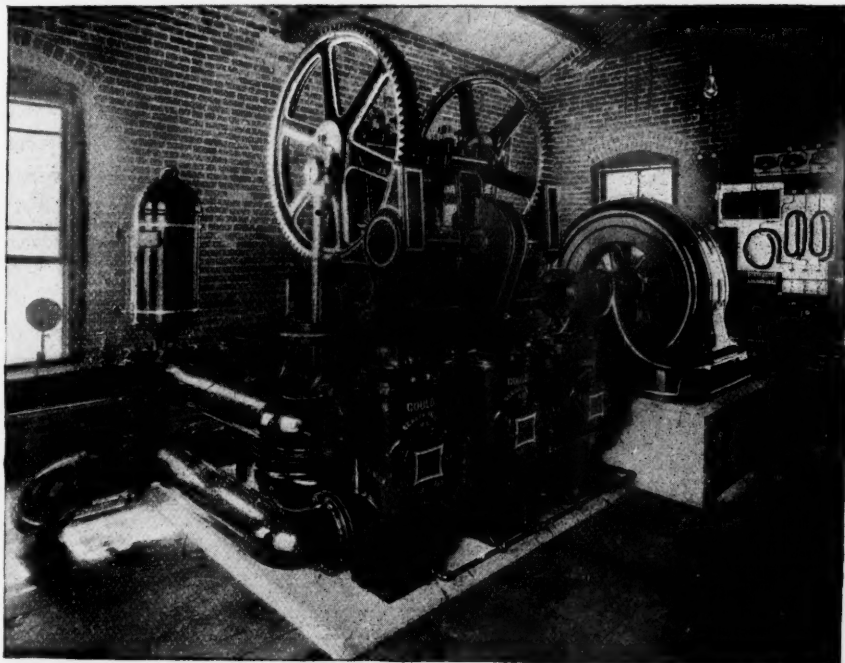
Reversal of New York Railroad Commissioners' Decision in the Long Lake Railroad Case.

The New York State Supreme Court, Appellate Division, has, on application, reviewed the determination of the State Railroad Commissioners in declining to grant a certificate of public necessity and convenience in the case of the Long Lake Railroad Company, and has decided that a certificate, under section 59 of the railroad law, should be issued. The case was heard by Justices Parker, Landon, Putnam, Herrick and Merwin. Presiding Justice Parker wrote the decision, and Justices Herrick and Merwin filed a dissenting opinion.

The Long Lake Railroad Company was organized April 17, 1895, to build a railroad from Axton, Franklin County, in the Adirondack forest, southerly about 10 miles to Long Lake. The application for a certificate was opposed by the New York Central road and by certain individuals organized to protect the state forest preserve. Judge Parker concedes that the burden of proof is upon the applicant, and that the Court should assume the Railroad Commissioners to possess greater technical knowledge than the Court; yet he holds that the certificate should have been granted.

He finds that the entire community affected desires the road. The Forest Preserve Commission makes no objection; the principal objector is a railroad owning a line through the heart of the Adirondack forests; no other road can furnish the advantages which can be had by building the proposed line; and land owners will donate the right of way.

The applicants, through another organization, propose to build a road from Axton northward to Tupper Lake to



Gould Pump and 75-H. P. Induction Motor at Itasca, Wis.

ington, New York, Chicago and half a dozen other cities. The complaints calling the Commission to these various cities are spoken of as evidence "of a general discontent with present transportation conditions," and this is held to emphasize the necessity of giving greater force and finality to the findings of the Commission. The question whether the Commission may, in deciding that a rate is unreasonable, order the adoption of a rate which it deems reasonable, has come up in several cases and is still unsettled.*

The matter of grain rates through Missouri River points, as affected by the practice of stopping off at Kansas City and subsequently sending forward at the balance of the through rate, is now under consideration by the Commission and has not been decided, but the report gives some of the facts as follows:

"Under this practice grain brought from producing points to the Missouri River upon which local rates have been paid was afterward re-shipped to Mississippi River points, Chicago and other points at the difference between the through rate from the original point of shipment and the local rate to the Missouri River. This difference or balance was always less than the established rate for like service from Kansas City and other Missouri points to the eastern destination. From Kansas City to Chicago the regular rate of 17 cents was thereby reduced often as low as 7 cents per hundred, and it was stated that by this system it was possible to make the charge as low as 2 cents, though the published rate was 17. So, also, the through rate from Northern Nebraska by direct lines to Chicago was "protected" on shipments to Kansas City afterward re-consigned from that point to Chicago, though there were no established through rates via Kansas City. Such grain had an advantage in the Chicago market of four or five cents a hundred over grain grown near Kansas City. The practice of "milling or cleaning in transit" prevailed substantially on all the lines investigated. On most of the roads the grain milled could be stored six months before reshipment at the "balance of the through rate." Grain from west of the Missouri was often carried to

cent. had automatic couplers and 99 per cent. train brakes. Of the 1,217,064 freight cars reported, 30 per cent. had train brakes and 37 per cent. automatic couplers, this last including some, however, which will not couple with the M. C. B. type. The law requiring drawbars to be of the standard height appears to have been fairly well obeyed.

The Commission recommends the establishment of a Bureau of Statistics and Accounts "to exercise a direct and controlling influence in railroad accounting." Ticket brokerage is characterized as a positive scandal, and the report recommends that it be made a penal offense for anyone to sell tickets without a written appointment from the road. Passes and reduced rates to shippers, and complimentary passes, are strongly condemned. A person who accepts a pass, except as provided in the Interstate Commerce Law, ought to be made to feel the penal provisions of the law. The full report contains a discussion of employees' relief departments, and an abstract of laws relating to railroad regulation in states.

The report ends with nine proposed amendments to the Interstate Commerce Law as follows:

1. To confine the procedure in the courts for enforcement of orders of the Commission to the record made before the Commission, and to provide that the order of the Commission shall be enforced unless the Court shall find in the proceeding some material error which furnishes sufficient reason for refusing to enforce it.

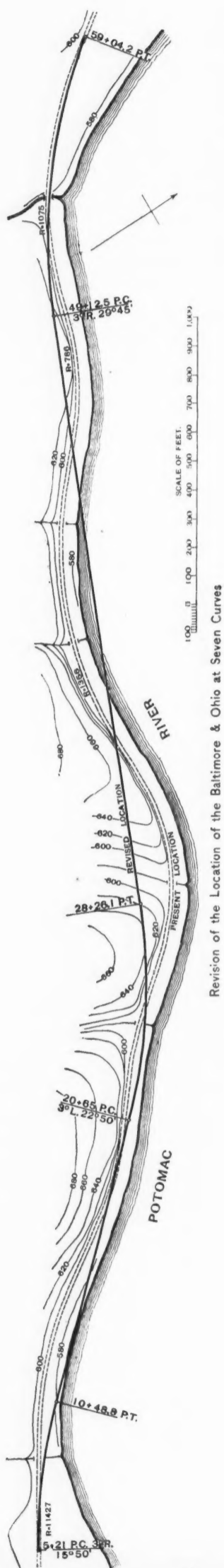
2. To so amend section 15 as to make it expressly provide that the Commission may, after due procedure and investigation, issue an order requiring the rates, facilities, or practices complained of to be changed, modified or corrected as in the order specified.

3. To make railroad corporations liable to indictment for offenses against the statute, as well as their officers, agents and employees.

4. To require the carriers to adopt a uniform freight classification.

5. To make the rate sheets, reports and contracts of carriers on file with the Commission, by express provision in the statute, competent testimony and *prima facie* evidence of what they purport to be in all proceedings before the Commission or in the courts.

* A case embodying this question is now before the Supreme Court, we believe, but the report before us does not say what case that is.—EDITOR.



connect with the Adirondack & St. Lawrence, and a certificate for this has been granted by the Commissioners, but they intimate that the road is not to be built; the Court, however, holds that there is no evidence to that effect.

The evidence before the Court shows large lumber interests in this region, and summer hotels which are much frequented. The summer residents now have to cart their freight 40 miles, from North Creek, at an expense of 75 cents per 100 lbs. There is much water power close to the line of the road.

It is objected that the road will cross lands belonging to the state, but the title to the lands in question is doubtful; it cannot be determined by the evidence; and even if the state does own these lands the granting of a certificate will not prejudice its right to stop the construction of the road upon any land that belongs to it. The Railroad Commissioners did not base their refusal on this ground. It is not right to deny the application on the ground, as proposed by the Commissioners, that the construction of the road will enhance values so as to make it more expensive for the state to establish the proposed state park. The concession that the road will enhance values is strong evidence that it is needed.

The Court does not admit that the policy of the state, aiming to preserve the Adirondack forests, necessitates the exclusion of all railroads. The line of a railroad is such an insignificant strip through these immense forests that it practically detracts nothing from their beauty, and is hardly an invasion of their solitude.

The Commissioners did not thoroughly analyze the evidence for and against public necessity and convenience. Their decision seems to have been controlled by the fact that the certificate for the line north of Axton was secured before application was made for the Long Lake road. In other words, a road 10 miles into the forest was allowable, but 20 miles would be going too far. The soundness of this reasoning is denied. It is objected that the promoters, in organizing two separate companies, are not acting in good faith, but what harm can this do? If they intend, by so doing, to charge extravagant rates they can be controlled by the law.

The dissenting opinion is written by Justice Herrick who holds, as was held in the case of the Depew Railroad, that the Court cannot consider the evidence as if it were determining the matter in the first instance. The weight given by the Commissioners to the evidence should guide the Court. Unless the Court finds erroneous legal principles or something contrary to the clear weight of evidence, or that the Board has abused its discretion, it should not reverse a decision of the Commissioners. None of these objections apply here. The Commissioners were right in taking into account the degree of good faith manifested by the applicant. The lands in this part of the state are owned in large tracts by the state, by lumber companies and by speculators. The only industry is lumbering and the keeping of hotels and boarding-houses. Axton is only a lumbering camp and the other terminus has no houses whatever. The line of the road is all owned by a lumber company and by two private individuals. The fact that these will donate the land does not mean much. For passenger business the road would depend on a steamboat connection on Long Lake, but that lake is often so full of logs that the small tug now upon it cannot be run. The iron mine, spoken of in the evidence, is several miles distant from the road. The Commissioners were right in considering whether the proposed road would be self-supporting, and Judge Herrick finds it hard to see how this question can be answered in the affirmative. Even if the importance of the lumber traffic be admitted, that is a temporary business. The Adirondack wilderness is a resort of tourists, largely because it is a wilderness; but the railroad, if it takes away the lumber, will destroy the attractiveness of the country. The building of railroads does materially interfere with the policy of preserving the wilderness, and the fact that certificates have been issued to some companies is no reason why the evil should be increased by granting them to others.

A Revision of Line on the Baltimore & Ohio.

We publish a plan, covering a little over a mile of the main line of the Baltimore & Ohio, showing an important work of revision.

The portion of the road known as the Seven Curves is situated on the Second Division of the main line, 10 miles east of Cumberland. The alignment is a succession of curves to the right and left, with short tangents between them, following closely the bends of the Potomac River for a distance of about one mile. The original location was made with a view of cheapening construction, and, even with the great amount of curvature introduced, it was a very expensive line to construct, the points of the mountains, which are very abrupt, pushing far out into the bends of the stream, making heavy cutting necessary in order to get around them. In this original line there were 206 degrees of curvature, varying from a 30' to a 7' 40' curve, and this aggregation of curvature made it difficult to maintain a high speed for the passenger trains and added considerably to the resistance of the heavy trains. The new alignment introduces 70 degrees of curvature, made up by three curves of 3 degrees each, thereby eliminating 136 degrees, the grade being level. The construction of the new line necessitates the removal of about 150,000 cu. yds. of material, almost entirely rock, and the rebuilding of 500 cu. yds. of masonry at Dans Run. About

two-thirds of the excavation has been taken out, and it is expected to have the entire work completed early in the spring.

Train Accidents in the United States in November.

COLLISIONS.

REAR.

1st, on Burlington & Missouri River, near Malcolm, Neb.; a passenger train ran into the rear of a preceding freight, wrecking the caboose and killing a passenger who was riding in it.

1st, on International & Great Northern, near Grand Lake, Tex., a freight train descending a grade broke in two and the rear portion afterward ran into the forward one, making a bad wreck. A tank car of oil took fire and 10 loaded cars were burned up.

9th, on Southern Railway, at Witt, Tenn., a freight train descending a grade broke in two and the rear portion afterward ran into the forward one, wrecking 6 cars. One brakeman was injured.

16th, on New York Central & Hudson River, at Carthage, N. Y., a passenger train ran over a misplaced switch and into some freight cars standing on a side-track, wrecking the engine and two freight cars. The conductor was injured. The wreck took fire, but the flames were soon extinguished.

21st, on Philadelphia & Reading, at Keffer, Pa., a passenger train ran into the rear of a preceding freight, making a bad wreck. One brakeman was injured.

25th, 3 a. m., on Pennsylvania road, at Millstone Junction, N. J., an eastbound freight train, running upon track No. 2, broke in two on a descending grade and the rear portion afterward ran into the forward one, derailing several cars, which fell upon track No. 1 immediately in front of an eastbound passenger train running at high speed. The passenger engine was overturned and fell down a bank and the engineman and fireman were scalded and crushed to death. The mail car and two express cars were derailed and wrecked and one express messenger was injured. Two sleeping-cars were derailed, but no passengers were injured.

26th, 6 a. m., on Seaboard Air Line, at Laurel Hill, N. C., a mixed train, with a sleeping-car at the rear, standing at the station, was run into by a following freight train, and the engine and sleeping-car were badly damaged. The engineman was killed and the fireman and one brakeman were injured. There was one passenger in the sleeping-car, who seems to have got out safely. There was a dense fog at the time, and the flagman had not gone back far. It is stated that the duties of porter for the sleeping-car and flagman for the train were performed by one colored person.

And 12 others on 9 roads, involving 17 freight trains.

BUTTING.

1st, on Southern Railway, near Lexington, N. C., butting collision of freight trains, wrecking 13 cars; 2 trainmen injured. One of the enginemen misread a telegraphic order.

2d, on Erie road, at Hancock, N. Y., two freight trains backing into a turnout from opposite ends collided, wrecking both cabooses and 5 cars. The wreck took fire from the stoves in the cabooses and was burned up. There was a dense fog at the time.

6th, 7:30 p. m., on Denver & Rio Grande, in the tunnel at Tennessee Pass, Col., butting collision between westbound passenger train No. 1 and an eastbound livestock train, badly damaging the engines and several cars. The freight train was wrongfully running on the time of the passenger. The Salida Mail, reporting this collision, says:

"The smoke in the tunnel was so dense that nothing could be seen and when the two engines crashed together without a second's warning to either crew the men thought the tunnel had caved in. It was all over before anyone realized what was wrong, and to this alone is due the fact that no one was killed or even seriously injured. Had anyone attempted to jump the chances are that the act would have cost him his life."

"Conductor Willis, the head brakeman, and the engineman and fireman were on the freight engine. All were in seats in the cab at the sides of the boiler. The engineman and fireman on the passenger engine were also in their seats. The collision crushed the pilots and front ends of each engine and both tanks were pushed from their platforms and jammed up against the fireboxes, but the cabs were not broken off. The baggage and mail car was telescoped over the tank until its forward end struck the engine cab. The express car was telescoped into the mail car about 15 ft., so that the mail clerk had only a few feet of clear space near the center of the car, where he happened to be standing. Some of the men on the engine came out of the wreck with skinned noses and bruised heads, but a little court plaster remedied these difficulties. None of the passengers were hurt. Not a wheel left the track. The passenger engine, tank, mail and express cars were not pulled apart, but were brought to the shops here just as they were taken from the tunnel. Only about two hours were necessary to clear the track, so that no trains were delayed for any great length of time."

13th, on Central of New Jersey, near Atlantic Highlands, N. J., butting collision of passenger trains, badly damaging both engines and both baggage cars. One baggage man was injured.

14th, 6 a. m., on New York, New Haven & Hartford, near Naugatuck, Conn., butting collision between a freight and a passenger train, badly damaging both engines. The engineman of the freight and the conductor of the passenger train were injured. One of the freight cars took fire and the city fire engines had to be called. It is said that the freight train, being delayed, sent a flagman forward to stop the passenger train, but that he failed to do so, misunderstanding his order.

17th, 6 a. m., on Philadelphia & Reading, at Mainville, Pa., butting collision between a freight train and an empty engine, badly damaging both engines and 7 cars. Two trainmen were injured. One of the trains disregarded a telegraphic order.

18th, on Southern Railway, near Round Knob, N. C., butting collision between a passenger train and an empty engine; one engineman and one fireman were killed. The runner of the empty engine misread a telegraphic order.

30th, on Northern Pacific, near Oriska, N. Dak., butting collision of snow plows; 1 employee was killed and 3 injured.

And 5 others on 5 roads, involving 10 freight trains.

CROSSING AND MISCELLANEOUS.

1st, on Louisville & Nashville, at Flomaton, Ala., a freight train ran into a switching freight, badly damaging both engines. One engineman was injured.

22d, on Lake Shore & Michigan Southern, at Erie, Pa., a passenger train collided with a baggage car, badly damaging it. The engineman jumped and was injured.

And 15 others on 13 roads, involving 2 passenger and 27 freight and other trains.

DERAILMENTS.

DEFECTS OF ROAD.

2d, on Wabash road, at New Haven, Ind., the engine and first car of a passenger train were derailed by a broken rail and the engine was overturned. A tramp was injured.

7th, on Southern Railway, near Glade Hill, Va., a passenger train was derailed by a broken rail and one car fell down a bank. There were only three passengers on the train, all of whom escaped with slight injuries. Three trainmen were injured. The wreck took fire and was burned up.

11th, on Union Pacific, near Ogallala, Neb., a passenger train was derailed, probably by a broken rail, and 5 passenger cars were badly damaged. A sleeping car took fire, but the flames were soon extinguished. The conductor and 5 passengers were injured.

14th, on Baltimore & Ohio, near Ellicott City, Md., a car in a freight train was derailed by a broken rail, and the contents of the car being gun powder, a terrific explosion followed. A fire, started by the explosion, burned up 5 loaded cars.

And 3 others on 3 roads, involving 1 passenger train and 2 freight trains.

DEFECTS OF EQUIPMENT.

10th, on Pittsburgh & Western, at Upper Etna, Pa., a freight train was derailed by the breaking of a wheel, and 9 cars were wrecked. A brakeman was injured.

19th, on Pennsylvania road, near Unionville, Pa., a freight train was derailed by the breaking of an axle

14th, on New York, New Haven & Hartford, at Mayflower Park, Mass., a car in a passenger train was derailed by ice in a fog and one passenger was injured.

14th, on Southern Pacific, near Clip, Tex., a live-stock train was derailed by running over a steer and the caboose was ditched. Four cars of cattle were damaged and 40 animals killed. The engineman was killed and the fireman injured.

20th, on Chicago Great Western, at Leavenworth, Kan., a passenger train ran into an electric street car crossing the track, and the engine and tender were derailed and damaged. The fireman was injured by jumping.

21st, on Atchison, Topeka & Santa Fe, at Paris, Tex., a freight train moving backwards ran into a street car, wrecking the caboose and the street car. One man was killed and two others injured.

And 4 others on 3 roads, involving 4 freight trains.

UNEXPLAINED.

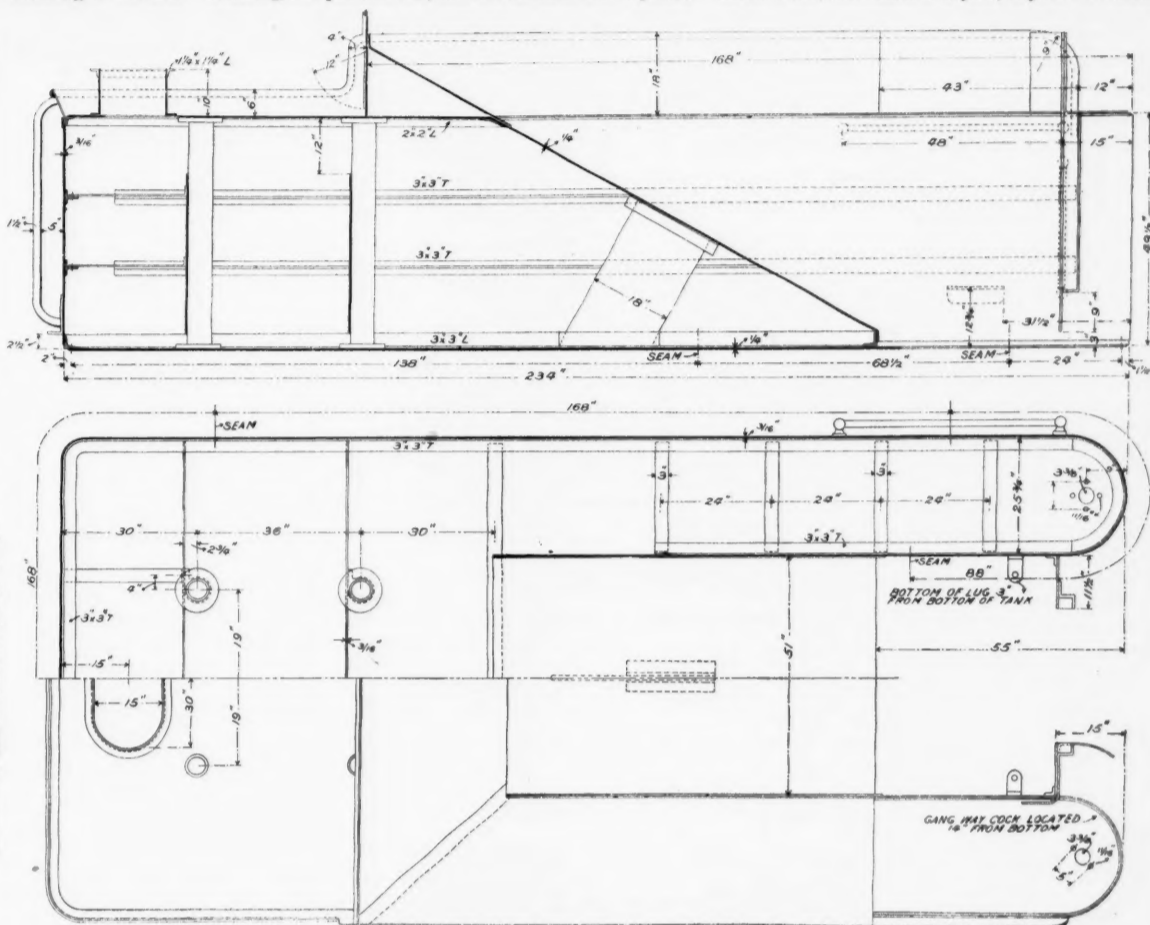
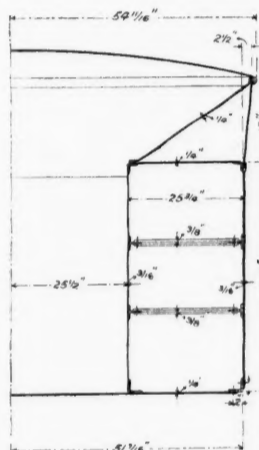
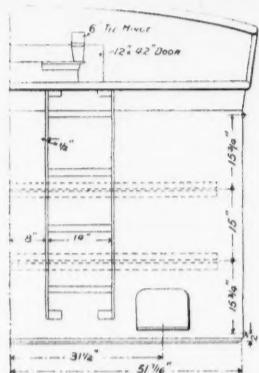
14th, on Little Rock & Fort Smith, near Morrilton, Ark., a freight train was derailed and one brakeman was injured.

27th, on Louisville & Nashville, at Rentchler, Ill., a coal train was derailed and wrecked and the conductor was killed. Two brakemen were injured.

And 21 others on 17 roads, involving 2 passengers and 19 freight and other trains.

OTHER ACCIDENTS.

3th, on Lehigh Valley, near Rochester, N. Y., the engine of a passenger train was badly damaged by the breaking of a parallel rod, and the fireman was injured.



4,000-Gallon Hopper Tank—Wabash Railroad.

and 10 cars were wrecked. Two men on the train, apparently trespassers, were killed and a third was badly injured.

22d, on Buffalo, Rochester & Pittsburgh, at Bliss, N. Y., a freight train was derailed by the breaking of a wheel and several cars fell through a trestle. Two brakemen were injured.

28th, on Great Northern, at Butte, Mont., a car in a freight train was derailed by a broken wheel and a brakeman was killed.

28th, on Great Northern, near Silver, Mont., a freight train was derailed by a broken wheel and the conductor and one brakeman were injured.

And 7 others on 6 roads, involving 3 passenger and 4 freight and other trains.

NEGLIGENCE IN OPERATING.

17th, on Chicago, Burlington & Quincy, near Edwards, Ill., a freight train was derailed by a misplaced switch and 15 cars were wrecked. A brakeman was injured.

30th, on Northern Pacific, west of Butler, Mont., a freight train descending a grade became uncontrollable and ran at a high speed for about 8 miles. In the course of this distance all but one of the 30 cars of the train were derailed and wrecked; one brakeman was killed and 3 other trainmen were badly injured. The train became uncontrollable in the Mullan tunnel. About a mile from the tunnel the fireman jumped off and was badly injured. At every sharp curve one or more cars left the track. At the Iron Ridge tunnel 5 cars fell down a high bank, the brakeman who was killed being on one of these. At Butler the engine and 3 cars were ditched, leaving the fourth car, with one brakeman upon it, which was stopped in safety. The engine had been badly damaged, before running off the track, by the breakage of the side rods.

UNFORESEEN OBSTRUCTIONS.

10th, on Northern Pacific, at Paradise Bluffs, Mont., a westbound passenger train was derailed by a landslide and several cars were ditched. The engineman was killed and three trainmen were injured.

13th, 3 a. m., on Louisville & Nashville, near Montgomery, Ala., a passenger train was derailed at a point where a rail had been maliciously misplaced, and the whole train of 5 cars was badly damaged. Five passengers were injured.

25th, on Missouri Pacific, near Muscotah, Kan., the flange of the driving wheel of a locomotive was broken, and a small piece which was detached was thrown with such force against the air-brake hose as to instantly tear it open, thus applying the brake before the breakage of the tire was otherwise discovered.

And 2 others, involving 1 passenger train and 1 freight. A summary will be found in another column.

The Hunt Brake for Light Service.

The Hunt Air Brake Co., New Kensington, Pa., is progressing in introducing air brakes for service on electric, elevated or cable roads. The company claims to have the best air pump and threeway valve for this class of apparatus, and that with fair voltage, pressure has been raised from zero to 70 lbs. within two minutes. A sufficient pressure of air is stored in the reservoir within a very short time after the trolley is applied to the line, and were the trolley to jump from the line after being on only a moment, sufficient air would be stored to allow the motor-man to make a number of stops. Among the recent additions may be mentioned the use of aluminum. The first equipment, which was somewhat objected to in the way of weight (the motor and pump and connections being combined in one piece of apparatus) has by the use of aluminum been materially lightened, making the apparatus now available to be carried on the platform of almost any well-constructed car. This aluminum metal is the product of the Pittsburgh Reduction Co. All of the apparatus is composed of aluminum other than the pump and motor castings. Another improvement is the small compound combined pump motor brake, being a special design for short cars which can be carried under the seat or under the car. This apparatus is very light and occupies a space 32 in. long, 14 in. high

and 12 in. in width. Both of these combined motor brakes are controlled by a new automatic controller which occupies a space 14 in. x 7 1/4 in. x 3 1/4 in., made of polished aluminum, other than the points of contact, encased in an aluminum case, with glass face. By this device the pump is automatically controlled, the maximum pressure being, say, set at 70 lbs. and the minimum being at 40 lbs., allowing a variance of 30 lbs. between the cut-in and cut-out of the pump. Should the trolley jump from the line the pump is automatically stopped; and when again adjusted is started. To avoid possibility of an accident by excess current, etc., the Hunt Co. has provided a "midget" cut-out, by which the excess current is discharged.

Another novel use to which the combined motor pump is being put is that of furnishing air by means of a hose connected with the pump by which the motors and controllers are cleaned. Air is also used for cleaning car seats and other parts of the cars, and this method is also being used in power-houses for cleaning the machinery.

The Hunt Co. has now in operation its axle-connected brake on the following roads: Cleveland & Elyria; Akron, Bedford & Cleveland; Pottsville Electric; Norfolk & Ocean View; Binghamton Electric. Orders are now being filled for combined motor brakes for Norfolk & Ocean View; Cleveland & Elyria; Elyria & Lorain; Mt.

Clemens Fast Line; Saginaw & Bay City; Akron, Bedford & Cleveland. The company has also just equipped with trail brakes the new cars of the Wilkes-Barre & Northern. It is furnishing some roads with a combined motor pump for use in power-houses for cleaning purposes. This apparatus can be carried around and connected up with the current at points convenient for the work required, and by the use of a hose connection the air can be applied for cleaning in spaces otherwise inaccessible.

New Hopper Tank, Wabash Railroad.

Through the courtesy of Mr. J. B. Barnes, Superintendent of Motive Power and Machinery of the Wabash Railroad, we are enabled to illustrate the new hopper tank used on the locomotive tenders now being built at the company's shops, at Springfield, Ill.

The increased weight of trains hauled and long distances now run between stops demand tanks of larger capacity than have been used heretofore. These new tanks are also designed so that the floor and sides slope toward the front, saving the fireman the work of shovel-coal forward.

The tanks are built of steel throughout, 1/2-in. plates being used for the sides and 1/4-in. plates for the top and bottom. As will be seen from the drawing the construction is very strong and the sides are firmly braced by means of plates and angles. The coal capacity is 8 tons and the water capacity 4,000 gals.

The tenders, of which these tanks are a part, have 4 wheel swivel trucks, with diamond frames, rigid steel bolsters, steel spring planks and triple elliptic springs. The Gould automatic coupler is used.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The locomotive output of the contracting shops in 1896 exceeded that of the previous year by 74 locomotives, but exceeded the number built in 1894 by 480 engines, or more than two-thirds of the total output of the earlier year, 695 engines. The actual number of engines built in 1896 was 1,175, and last year 1,101 engines. In spite of this increase the year just past was not a very fortunate one for locomotive builders, although they appear to have fared much better than the car builders, judging by the incomplete returns of car building now at hand. Six companies, out of the 12 reporting (all the locomotive building concerns except the one which has, perhaps, the smallest output), increased their output over the previous year, building 800 engines in 1896, against 597 in 1895. Considerably more than half of this increase is reported by one company, while another of the large companies doubled its output. Taking out the product of these two companies, it will be seen that the others shared very little in the increase, the output of each, as a matter of fact, being nearly the same as in 1895. But the other six companies from which we have reports did not do even so well as to maintain their 1895 record. Grouping the output of these companies, we find that they built 492 engines in 1895 and 117 less this year. The loss is well distributed, although one company built less than half the engines it turned out in the preceding year. An interesting feature of locomotive building in this country is the growing importance of export orders. Two years ago, the number built for export was only 80, while in the past year the number had increased to 309. Thus, while but 11 per cent. of the total of 1894 was for foreign countries, more than 26 per cent. of the engines built in 1896 were exported. Government figures for parts of years are at hand in the last report of the Bureau of Statistics. They show that in the 10 months to Oct. 31, 1896, 279 locomotives, valued at \$2,635,000 (an average of nearly \$10,000), left the ports of this country, as compared with 156 locomotives valued at slightly over one and a half million dollars exported in the same period in 1895. Several locomotive works are now engaged on export orders, of which that for 31 engines for Japan at the Rogers and Baldwin shops is most interesting. Locomotive building, though better in 1896 than in either of the two preceding years, is still far below the figures reached a few years ago, as will be seen by the following recapitulation of the number built in each of the last six years.

1896	1895	1894	1893	1892	1891
1,175	1,101	695	2,011	2,012	2,165

What the new year may bring it is useless to try to guess. None of the contracting shops has orders which cannot be disposed of in a short time, and so far there has been little evidence to show that the railroads are going to give out the orders that the locomotive builders would like to have, and are convinced are required by the railroads. The waiting

policy is evidently still the controlling one, as for a long time past. With an assurance of a steadily increasing traffic, which has been so long coming, the hearts of the locomotive builders may yet be gladdened with welcome contracts.

The Interstate Commerce Commissioners recommend nine amendments to the Interstate Commerce Act, all in the direction of bringing the railroads of the country more under the control of the Commission. All of the amendments now proposed were asked for last year, and most of them have been repeatedly recommended by the Commission in years past. They proceed on the theory, now attractive to a great many people, that all human enterprise needs to be "regulated" by the state, and that when a man is invested with public authority he becomes at once wiser and more honest than he was in private life. So the assumptions are made that the railroads are public enemies; that the failure of the Interstate Commerce Act to make them virtuous is due not to the infirmities of the Commission but to the weakness of the law, and that if the Commission is endowed with the powers of a court of law, and indeed with even greater powers, then the beneficent purposes of the Act will be realized. These broad assumptions are quite contrary to our political and social notions, but we need not stop to debate them now. The Act has done good and it has done harm. It might have done more good and would have done less harm if the Commission had been of different caliber and temper, especially in the last three or four years, and had endeavored to work in concert with that very large body of railroad officers who are trying to make the traffic side of the railroad business as honorable as the transportation side is; who are trying to make their railroads reasonably safe and profitable investments, who, in short, are working along the only line that can lead to the highest and most lasting public usefulness of the railroads. So long as the Commissioners occupy the position of unreasoning antagonism, which they have taken up in recent years, they will do more harm than good and the less power they have the better. They are not only tying the hands of those railroad administrators who are trying to improve the service, but they are giving the public a misleading and vicious education as to the rights and relations of the people and the railroads.

The number of passengers killed in street cars in the United States in a year may be as large as the number killed in the cars of standard (steam) railroads, or perhaps larger; but comparisons between the two records have a very uncertain basis to rest upon, and a press despatch from Harrisburg, giving some deductions which seem to have been made by the Superintendent of the Pennsylvania State Bureau of Railroads, should be noted chiefly as a warning not to give much weight to such figures. The despatch says:

There were 32 passengers killed on the street railways in this State during the year ended June 30 last. These figures show that in proportion to the distance carried there is a greater liability to accident to passengers on street railways than on the steam roads. The number of passengers killed on the steam railways operating in Pennsylvania, with a mileage of over 19,000, was only 37. On the street railways in the United States there were more than three times as many passengers killed as employees, while on the steam railways there were 13 times as many employees killed as passengers.

The Pennsylvania figures evidently include horse-cars as well as electric. This may not be an important element, but the fact suggests one of the principal differences running through all of these records, the difference in speed. To this fact is due a marked difference in the character of the accidents. In some of the worst accidents on street railroads large numbers of passengers have escaped by jumping off and landing on the ground with little injury. Again, these statistics apparently include all passengers killed from any cause; but on standard (steam) railroads many more passengers are killed by their own fault than in train accidents or by any fault of the railroad company. Whether this is the case on street railroads we do not know, but evidently the only instructive basis of comparison, as related to improvement in the service and prevention of accidents in the future, is the number killed by the fault of the carrier or his employees. The accident list, so far as it is based on the ignorance or carelessness of passengers themselves, is a hard one to reduce, and it is questionable whether much betterment is possible until we can change human nature. The arrangement of stations, platforms, gates, steps and other fixtures and appliances are matters not susceptible of much improvement, as regards the prevention of accidents; at least the best practice and methods are already well known to every railroad superintendent, whether of a standard road or a street road.

For the fiscal year covered by the Pennsylvania figures above quoted, the number of passengers killed in train accidents on steam railroads in the United States, as reported in the *Railroad Gazette*, was 38, including some who were riding on freight trains. During the same year we made notes of such electric-car accidents as we found in the daily newspapers, and the number of persons killed is recorded as 45. This includes 15 killed in the drawbridge disaster at Cleveland in November, 1895, and it may include some conductors and motormen. The contrast, set forth in the above quoted item, between the number of passengers killed and the number of employees, is entirely misleading. On street cars employees not only are small in number as compared with the number of passengers; but, being on the outside of the car, they often have a good chance to jump off when disaster threatens. On the other hand, of the number of employees of standard railroads killed, the great majority are on freight trains or in yards, being a class by themselves, with which there is nothing on street railroads to compare.

David Leonard Barnes.*

Born Aug. 23, 1858—Died Dec. 15, 1896.

In undertaking to write about a man so attractive, a working companion so zealous and able and reasonable, and a friend so generous and constant as David Barnes, it is hard to avoid exaggeration. It is impossible to write with a mind unaffected by sentiment; but I shall endeavor to observe moderation and justice. I can speak with close, and even intimate knowledge, extending over the last eight years. Mr. Barnes joined the editorial staff of the *Railroad Gazette* in December, 1888, and his transparent sincerity, his courage and his docility made it possible to come to a perfect understanding with him at once; and whatever questions of knowledge or judgment or policy came up, as time went on, no question of our entire confidence in each other ever arose.

Mr. Barnes' qualities and career were not accidental. He came on both sides from thrifty, pious, self-reliant New England stock. He was born at Smithfield, Rhode Island, near Providence, and very early began to show the contrivance, the dexterity and the instinctive appreciation of the relations of materials and forces which a man must have if he is to succeed as an engineer. When he was only about 11 his father died and young Barnes soon became the man of the family and began the exercise in a serious way of self-reliance and responsible judgment. At 15 he began work with a civil engineer, and was occupied two or three years in surveys and city work. In 1876 he entered Brown University, and spent three years there and at the Massachusetts Institute of Technology, as a special student, doing engineering work in vacations. He eventually received the degree of Master of Arts from Brown, but took no degree at the Institute of Technology. In 1879 he began work in locomotive shops, and in the next eight years served in various capacities in the Rhode Island, the Hinckley and the Rome works. He eventually became Chief Draftsman and Mechanical Engineer at the Rhode Island Works. The last year of his service there, 1887, he began practice as a consulting engineer, doing work of some importance for various clients. For the last eight years he has maintained an office as consulting engineer in Chicago, with a New York connection, and he has also been on the staff of the *Railroad Gazette*, not merely as a writer, but with editorial responsibility. He has very largely influenced the conduct of the paper in mechanical matters, and especially in locomotive engineering.

Mr. Barnes' activity in these last eight years has been prodigious; probably it killed him, but even dying at 38 he had lived more than most men. He wrote much, not only unsigned articles in the *Railroad Gazette*, but over his own name in the transactions of the various technical societies and clubs to which he belonged. He was fond of writing and always had two or three articles and papers on hand in various stages of preparation. But he had little enjoyment in mere composition. Writing was to him only another form of talking, a means of conveying his thought. But he keenly enjoyed thinking and discussing, and this he did with great vigor. So it came about that he was never conscious of his style in writing and often, especially in his earlier work, brought out his meaning with some difficulty. But he thought so straight that he had the founda-

*Mr. Barnes was a member of the American Society of Civil Engineers, the American Society of Mechanical Engineers, associate member of the Institution of Civil Engineers (British), member of the Western Society of Engineers, an associate member of the Master Car Builders' and Master Mechanics' Association, a member of the Western Railway Club and a member of various other technical associations. He was a member of the Union League Club of Chicago, the Manufacturers' Club of Philadelphia, the Engineers' Club of New York and other scientific and social organizations.



Sam'l L. Barnes.

[illegible]

tion of the best possible style; his writing improved from year to year, and had he lived he would have made a reputation for clear and energetic expression. His numerous papers and reports on locomotive engineering, on car construction and on electricity as a motive power for railroad working form a body of scientific literature of permanent value, not only in what he said, but in what he suggested. The only book which bears his name is the revised edition of "Compound Locomotives" by Arthur Tannatt Woods, also one of our editorial staff. When Mr. Woods died he left the manuscript of this revision quite incomplete. As a work of friendship and of scientific interest Mr. Barnes helped Mrs. Woods to prepare this manuscript for the press, and he gave to it a great deal of intelligent labor. It is not strictly correct to say that this is Mr. Barnes' only book, for, no doubt, he would have wished to have included in his writings the excellent little treatise on "Electric Locomotives" prepared by him last winter and lately issued as a trade publication.

Mr. Barnes' work as a consulting engineer has been in design, tests, inspection and reports, covering the whole range of railroad rolling stock, for many different clients. Here his skill has left permanent results in a great number of details. As the Chicago & South Side Rapid Transit Railroad (Alley Elevated) neared completion he was retained by that concern, and had general supervision of the design and construction of its rolling equipment, signaling, lighting and shop plant. He, more than any other man, was responsible for equipping the line with compound locomotives. Probably if he had done the work three years later he would have put in electric motors; but that would have been an unjustifiable experiment in 1893.

Mr. Barnes' most important recent work was as Consulting Engineer for the Baldwin Locomotive Works and the Westinghouse Electric & Manufacturing Company in designing a set of standard electric locomotives. When those companies decided to join forces in preparing to build electric locomotives in a systematic way, they secured Mr. Barnes' services, on the theory, we may suppose, that the knowledge of both the locomotive engineer and the electrical engineer should be co-ordinated and applied. Mr. Barnes threw himself into this work with enthusiasm and he brought to bear his intimate knowledge of the requirements of railroad work, and his great faculty for clearing away the non-essentials, and a set of designs was produced, remarkable for robust simplicity and adaptability to the actual work of hauling trains. Mr. Barnes never claimed that he alone was responsible for these designs. He was the last man to claim more than his due, or to belittle the part which others had in his work.

This is but a very brief and inadequate note of Mr. Barnes' activities, but I must end it with the mere mention of a part of his work of the magnitude and value of which few persons have any notion; that was his work for others. He had become in recent years the informal and unpaid adviser of a multitude of railroad officers of all ranks. He gave them his precious time and strength freely, and they often used it with little compunction, and sometimes with little gratitude. His clear and fertile mind and his sound knowledge helped many men out of their troubles in matters of practice and in reports. A great deal of the best that has appeared lately in the publications of the Master Car Builders' Association, the Master Mechanics' Association and the Western Railway Club bears the marks of Mr. Barnes suggestions and advice. Another group of men who will miss him and who will remember him with gratitude are the young engineers trained in his Chicago office. There they supplemented their technical school education with an experience of long hours and hard work, under severe criticism, and learned to be real engineers; and there, in daily contact with this fine character, they got a moral and intellectual toning up which will influence the whole lives of the best among them.

Early last spring the malady which ended Mr. Barnes' life had made such progress as to somewhat alarm his friends, but no one suspected its nature. It was believed that rest would restore him. On the seventh of April he was married to Miss Ida, the daughter of Col. B. J. D. Irwin, U. S. A., retired, formerly Assistant Surgeon-General of the Army. With his wife he went to Europe, but soon returned for medical advice. During the summer his strength declined slowly but steadily; but he did not entirely cease work until within two weeks of his death. In fact, the last week of his life, and up to the last day, he amused himself, as he lay almost immovable in bed, making computations with a slide rule.

He had every reason to wish to live. His domestic life was singularly happy; he had a multitude of attached friends; he had reached a high place in his profession and was justified in believing that he could easily go far higher; but he died with the serene and uncomplaining fortitude of a great nature. With a cheerful countenance he set all his affairs in careful order, and then thought only how he could make the end easiest for those who remained behind.

Physically and mentally Mr. Barnes was a man of unusual strength and energy; no amount of work discouraged him; for years he worked nights and Sundays, and being quick and systematic he accomplished as much as two or three ordinary men. He was a natural mathematician, had strong powers of analysis and reasoning; had fine invention and loved to use his faculties. One of the most striking qualities of his mind was its beautiful lucidity. He could clear away the rubbish from a question with great promptness; he never got befogged with irrelevant details. In his many controversies he was not always right, and indeed he was sometimes suspected of hasty conclusions. There is one excellent way of avoiding mistakes, that is to say nothing. That was not Barnes' way. He was enthusiastic, candid and courageous, and being human he was sometimes wrong, but he was always stimulating and suggestive. And he never stuck to an error because it was his; he had the truly scientific love of truth. His courage was often useful in the societies and associations in fighting the battles of other men who for business or personal reasons did not wish to appear. He had great poise; excitement only steadied him, and even when he was angry, which was very seldom, he was temperate in speech and conduct. His bright spirits and his sweetness of temper and manner endeared him to old and young, and he has no more sincere mourners than the little children who knew him.

A strong and generous nature has passed away in Barnes' death. He had already achieved much, but he had hardly passed the starting point. He was in the very flower of his manhood; he had established his reputation; he was still growing in mental power and in judgment. It is a sad pleasure to dwell upon what he might have done in the next twenty-five years; but that is now a vain speculation. He had already lived a life, measured by achievement, and the world is richer and better for it; and the memory of his friendship is a precious possession. H. G. P.

The Long Lake Railroad.

The New York State Railroad Commissioners, acting under the law giving them restrictive powers, have within the past two years prevented the construction of two unnecessary railroads, the Depew & Southwestern and the Amsterdam, Johnstown & Gloversville; but in a third case, that of the Long Lake Railroad Company, the Supreme Court overrules them and says that the road may be built. We publish in another column the decision of the Court, lately issued.

It is clear that the whole issue hinged on the differing views as to whether the proposed railroad was needed or not. The Commissioners and the two dissenting Judges say that the road is not needed, and the majority of the Court says that it is. Various technical and minor points are discussed in the decision, but this one controlled. Whether the case can or will be carried up to the Court of Appeals we do not know, but in a matter of so much importance it is highly desirable that a final settlement of the legal points be reached without unnecessary delay.

The contention of the dissenting Judges is that the Commissioners' findings of fact shall not be disturbed, at least not for ordinary reasons. In saying this, Judge Herrick accords to the Commission some of the dignity and power of a court, and it is a view which probably will not be permanently accepted unless the highest court, or an amendment to the constitution, says so. The Interstate Commerce Commission is fighting for similar recognition in Federal matters and finds it uphill work.

The feeling is common that a railroad commission, whether in New York or any other state, should not have the power of a court, because it is too likely to be composed of unsuitable men. This feeling is based, not wholly on the fact that many state commissions have actually been filled by men of small caliber, but also on legal and political conditions. One legal condition is that the law requires, in some states, the selection of men from certain classes, as, for instance, in New York, one railroad man. A man may be a pretty good railroad while not learned in the law, and perhaps inept at weighing evidence. In Massachusetts they think they must have on the commission one "business man," whatever that may mean. A political condition hampering the appointing power is

the real or supposed necessity of consulting certain classes, as "labor," or the farmers, in selecting a Commissioner. Commissionerships are not held for life, as judgeships are in some states (and as they ought to be in all), and that prevents getting the best men for the salary offered. In New York the salary is large (\$8,000), but in the prevailing conditions of New York politics there is no assurance that this will get an eight-thousand-dollar man. The selection of lawyers for all commissionships does not, however, meet all the objections. President Cleveland tried that with the Interstate Commerce Commission, but that body has issued many weak decisions, and the courts have been pretty distrustful of it.

The New York Commissioners, if they had a strong case, as we think they had, very likely lost it by their slipshod way of setting it forth. If they had got some definite figures of the population and of the business done by the stages and wagons now serving the Long Lake region; and some facts concerning the starving condition of existing railroads which depend wholly upon summer hotels or upon denuded wood lots for a living, they might have convinced one more of the five judges, and won their case.

It does not appear how thoroughly the Commissioners inquired as to the ability of the promoters of the Long Lake road to furnish the money necessary to build a decent railroad. While the law does not specifically authorize them to do much in this direction they certainly should ventilate the question as much as they can. Again, the probable impairment of the forest as a natural park for health or pleasure ought to have been more fully discussed. A railroad is something more than a narrow strip through the woods. It invites squatters and is the entering wedge for other encroachments; and locomotives sometimes start big fires.

If the decision before us gives all the information available in this case, the principal conclusion to be reached concerning the New York railroad-restriction law is that it is good as far as it goes. When the Commissioners issue decisions under it which are contested, the fate of such decisions in the courts is likely to depend a good deal on the thoroughness with which they illuminate the facts in the case in question; and if additional powers or larger appropriations are needed by the Commissioners it is for them to make the need manifest.

November Accidents.

Our record of train accidents in November, given in this number, includes 49 collisions, 54 derailments and 4 other accidents, a total of 107 accidents, in which 14 persons were killed and 55 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident, as reported, make it of special interest.

These accidents are classified as follows:

COLLISIONS.	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two.....	11	0	0	11
Misplaced switch.....	1	0	3	4
Failure to give or observe signal.....	1	1	0	2
Mistake in giving or understanding orders.....	0	5	0	5
Miscellaneous.....	1	2	1	4
Unexplained.....	5	5	13	23
Total.....	19	13	17	49

DERAILMENTS.

Broken rail.....	6	Landslide.....	3
Defective switch.....	1	Street car on crossing.....	2
Broken wheel.....	7	Ice on track.....	1
Broken axle.....	5	Malicious obstruction.....	1
Misplaced switch.....	1	Unexplained.....	23
Runaway train.....	1		
Animals on track.....	3		4

OTHER ACCIDENTS.

Broken side rod.....	1
Breakages of rolling stock.....	1
Other causes.....	2
Total number of accidents.....	107

A general classification shows:

	Collisions.	Derailments.	Other accidents.	Total.	P. c.
Defects of road.....	0	7	0	7	6
Defects of equipment.....	11	12	2	25	23
Negligence in operating.....	15	3	0	17	16
Unforeseen obstructions.....	0	10	2	12	11
Unexplained.....	23	23	0	46	44
Total.....	49	54	4	107	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other accidents.	Total.
Passenger.....	13	13	3	29
Freight and other.....	74	41	1	116
Total.....	87	54	4	145

The casualties may be divided as follows:

	Collisions.	Derailments.	Other accidents.	Total.
Killed:				
Employees.....	6	4	0	10
Passengers.....	1	0	0	1
Others.....	0	3	0	3
Total.....	7	7	0	14
Injured:				
Employees.....	18	22	1	41
Passengers.....	0	11	0	11
Others.....	0	3	0	3
Total.....	18	36	1	55

The casualties to passengers and employees, when

divided according to classes of causes, appear as follows:

	Pass. Killed.	Pass. Injured.	Emp. Killed.	Emp. Injured.
Defects of road.....	0	5	0	5
Defects of equipment.....	0	0	1	6
Negligence in operating.....	1	0	7	22
Unforeseen obstructions and maliciousness.....	0	5	2	6
Unexplained.....	0	1	0	2
Total.....	1	11	10	41

Eleven accidents caused death, and 22 caused injury but not death, leaving 74 (69 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with November of the previous five years shows:

	1896.	1895.	1894.	1893.	1892.	1891.
Collisions.....	49	80	59	92	105	112
Derailments.....	54	62	84	101	84	110
Other accidents.....	4	4	3	7	9	4
Total accidents.....	107	146	146	200	199	226
Employees killed.....	10	38	17	43	44	46
Others killed.....	4	8	5	28	17	23
Employees injured.....	41	87	47	108	103	134
Others injured.....	14	32	19	87	96	73
Passenger trains involved	29	49	44	65	75	71

Average per day:

Accidents.....	3.57	4.87	4.87	6.67	6.63	7.53
Killed.....	0.47	1.53	0.73	2.37	2.03	2.30
Injured.....	1.83	5.63	2.20	6.50	6.63	6.90

Average per accident:

Killed.....	0.13	0.32	0.15	0.35	0.36	0.30
Injured.....	0.51	1.16	1.45	0.97	1.00	0.91

The total number of accidents shown in our record for November is much smaller than in that month for 10 years or more, and the number of persons killed and injured is also small. We might suspect that our reading of the daily papers for the month had not been as careful as usual, but the fact that the accidents of a minor character, those in which no person was killed or injured, are fully up to the average proportion of the total, indicates that none of the usual sources of information have been omitted. (Accidents in which persons are killed are generally reported in several different papers). During the past 12 months, of the total number of accidents, the average percentage doing no personal injury was 59, while in the month now reported no less than 69 per cent. come under the "harmless" head. The number of employees killed in November was less than in any month since 1887. As was the case in the early part of 1894, this record indicates, no doubt, a very light train mileage on nearly all the railroads throughout the country.

The one passenger reported killed in November was riding in a freight train. The most disastrous passenger train accident of the month was that at Millstone Junction, N. J., on the 25th, in which, however, no passengers were injured. The most unusual accident of the month was the runaway on the Northern Pacific on the 30th. A passenger train which was derailed at Glade Hill, Va., on the 7th, was badly wrecked and the wreck was burned up, but there were few persons in the cars and, fortunately, no one was killed.

At Atlanta, on the 5th, two employees were killed by the explosion of a locomotive boiler, but the engine appears to have been in the roundhouse at the time. Nine employees were injured by the wreck of a gravel train on the Licking Valley Railroad in Kentucky on the 21st, but we have not included this case in the record, as the road, a new one, appears not to have been open for business.

We find reports of only half a dozen electric car accidents in November, and only six persons were injured in them.

In an article entitled "The Fastest Train in the World," *Engineering*, of Dec. 4, describes a ride on the West Coast Tourist express, the night train of the London & North Western for Scotland. This is the train that during the past few years has made some of the very fast English records which have been compared with the best long runs in this country. Some notes on the schedule of this train were given in the *Railroad Gazette* of Aug. 14 last. The report in *Engineering* deals only with that part of the trip beyond Carlisle; that is, the Caledonian Railway part, on which this train is hauled by engines of the "Dunalastair" class, which have been in use for the last 11 months. These engines have four driving wheels 78 in. in diameter, cylinders 18½ in. x 26 in., and 1,403 sq. ft. of heating surface. The total weight in working order is only 47 tons and the steam pressure is 160 lbs. per square inch. From the data shown, the schedule time of this train can be compared with other trains only between stopping places. From Carlisle to Stirling, 117½ miles, the time is 2 hours 4 minutes, equal to 56.98 miles an hour. The Empire State Express is not scheduled so fast as this for an equal distance, but for the 80 miles from Syracuse to Rochester it is allowed one hour and 24 minutes, which is equal to 57.1 miles an hour. In the actual run reported by *Engineering* the time made was considerably better than the schedule, being:

Carlisle to Stirling, 117½ miles.....	59.3
Stirling to Perth, 33 miles.....	59.1
Perth to Forfar, 32½ miles.....	60.8

By taking out four miles from the beginning of the first stage, and two miles from the ending, we have a run of 111½ miles at 60.3 miles an hour; and this in spite of 50 miles of up hill, one check by signal, and 13 junctions within a distance of 36 miles. In the run reported, the stops at Stirling, Perth and Forfar consumed 16 minutes, being, approximately, 4 minutes, 10 minutes, 2 minutes. If these are the regular lengths of

these stops, the schedule through for the 240 miles is 54.61 miles an hour, as compared with 53.33 miles an hour for the Empire State Express through from New York to Buffalo. The English train on this run was composed of five cars, one of which was a sleeping-car and one a van. The weight is not given, but as all are described as bogie cars they probably weighed more than the average of English cars. For a run with a comparatively light engine with a train probably not very light, made wholly by night, this is an exceedingly fine performance, whether it be the fastest in the world or not. As remarked by *Engineering*, the locomotive engineers who make this trip, night after night, must be good men, well trained. *Engineering* says that if the best train now running between London and Liverpool were to be run as fast as this Caledonian train it would make its trip 52 minutes quicker than under the present time-table; and the fastest train between London and Holyhead would make its trip in 2½ hours less time if it should adopt the Caledonian rate.

The New York Board of Trade and Transportation has sent us a copy of a resolution recently passed by that body unanimously, to the effect that carriers and shippers should co-operate to eliminate unjust discriminations, and that pooling should be legalized under the supervision of the Interstate Commerce Commission. The Committee on Transportation, F. B. Thurber, Chairman, which reported this resolution, cites, as evils still existing and demanding attention, the constant efforts of a few shippers and a few roads to secure undue advantage over their competitors; the continued favoring of large shippers by carload rates, the difference between which, and the rates for small lots, is too large; the discrimination by the use of extra large cars (as described by Mr. Judd in the *Railroad Gazette*); and the payment of excessive mileage on freight cars owned by shippers. The report says: "Uniform and stable rates for transportation are necessary alike to the prosperity of shippers and carriers. Their interests are so intertwined that one can hardly be prosperous when the other is depressed. The competition of our waterways supplemented by that of our numerous railroad lines has given the United States much lower rates for transportation than any other country. While formerly there was danger that the public might be charged too high rates for transportation, that danger no longer exists. There is more danger that capital invested in transportation facilities will not receive its adequate reward." We are glad to see such a moderate utterance from a representative of mercantile interests; it is to be hoped that agitation of this kind will be continued. There is enough of the other kind which needs to be counteracted.

Railroads use about everything, especially when they run farms, opera houses and weather observatories, as well as hotels, coal mines and religious establishments; and the railroad storekeeper, therefore, has already entered on his records nearly every kind of movable merchandise that can be named; but we believe, nevertheless, that we have found a new item; it is the megaphone. This simple but highly scientific instrument is now used at the signal cabin in the Boston & Maine yard at Boston for communicating with engineers; and the men who use it express themselves as highly pleased with it. To get an idea of its value, one needs but to stand alongside of a man using the funnel as a receiver. He, holding the megaphone to his ear, will distinctly hear words spoken a few dozen rods away, which you, with only the natural ear, cannot understand at all. If we continue to improve our signal practice we shall probably have more and more occasion to require verbal communications between signalmen and trainmen. This would seem to be the lesson of the experience of our English cousins, in whose rules this requirement is frequently seen. Communicating by word of mouth is risky business except under rigid regulations; it is so easy, in speaking to or from a moving train, to assume that a message has been understood when the doubt is really so great that the train ought to be stopped. If such a method is to be permitted, all available aids ought to be employed, and if these are not employed it is doubtful whether oral communication at long distances or to moving trains ought to be allowed at all. Megaphones are sold in New York at from three to five dollars each, and handsome ones, made of aluminum, suitable for a general passenger agent to speak through, for ten dollars; so that anyone can readily test them for himself.

NEW PUBLICATIONS.

Modern Stone Cutting and Masonry. With Special Reference to the Making of Working Drawings. By John S. Siebert, C. E., and Frederic Child Buggin, B. S., Instructor in Architecture in Lehigh University. New York: John Wiley & Sons, 1896.

This is a modest book of only two chapters, containing, probably, not more than 8,500 words all told; but withal a very excellent work of a character much needed in its field for the use of advanced students. It also will be found a useful addition to an engineer's office library because of its correct and up-to-date definitions and classifications pertaining to masonry plans and specifications and other valuable information.

The method employed is practical and pleasing and well adapted for ready reference. Chapter I. is devoted to tools, the shape and finish produced by them, classifications of masonry, etc. Chapter II. takes up the study of different examples of well-designed actual struc-

tures, including arches, arch-culverts, railroad bridge masonry, canal lock masonry and several typical architectural constructions. The descriptions are sensibly illustrated with numerous page cuts in addition to fourteen well-executed plates of properly drawn plans of actual structures.

At first reading there is a sense of disappointment that the authors had not embraced a wider range of structures, more especially as they have shown themselves so wise in selection and so workmanlike in treatment. It is to be regretted, for instance, that the oblique arch has been purposely omitted; the reason given is that it is used but rarely, which is true, of course, but yet there are many cases constantly occurring where oblique arches would be desirable and economical, but are avoided, and clumsy, ugly and often more expensive expedients adopted instead, largely, if not indeed wholly, because of the lack of familiarity with the principles of their proper design. Not alone on that account should they find a place in a text-book of this kind, but also because the knowledge acquired by the student of the special tools, twist-rules, molds and manipulations for working a true skew arch would go far toward fitting him to deal with twisted stonework of all kinds. Throughout the book is reliable and valuable.

Retaining Walls for Earth. Including the Theory of Earth Pressure as developed from the Ellipse of Stress. With a short treatise on Foundations; illustrated with examples from practice. By Malvard A. Howe, C. E., Professor of Civil Engineering, Rose Polytechnic Institute; Member of American Society of Civil Engineers. New York: John Wiley & Sons. Third Edition, revised and enlarged, 1896.

Professor Howe's manual on retaining walls, the third edition of which lies before us, is not only an extremely valuable contribution to the literature of a somewhat neglected topic, but a very convenient book for practical use. The appendix of the former edition has been replaced by a short treatise on foundations in general, intended for use in technical schools.

The great merit of the work lies in the lucidity and compactness of the demonstrations and the happy combination of theory and practical example, all conveniently arranged for ready use and supplemented with tables of coefficients computed by the author to decrease the labor of substitution in the formulas. The demonstrations are based upon Rankine's theory of the Ellipse of Stress and are easily followed; for further convenience the formulas have been arranged in a condensed shape followed by numerous examples.

A fair idea of the scope of the work can be had from the headings of the chapters, which are Theory of Earth Pressure; Formulas for Earth Pressure; Foundations for Walls Retaining Earth, and Profiles of Walls Retaining Earth. The supplemental chapter on foundations in general is somewhat too superficial for much practical use, although not devoid of value. The part of it devoted to pile foundations, however, should be revised and corrected, as it is so full of error as to be useless or dangerous according to the degree of knowledge of the reader; the two hammer formulas given are wrongly stated and hopelessly confused in their terms, while the proposition advanced, that a pile formula should be independent of the means by which the pile is driven and be based upon the observed texture of the stratum through which it is driven, will find little support among practical men, although the subject is of course theoretically interesting. Professor Howe suggests such a formula, based on the experiments of W. M. Patton on contact friction.

Experiments upon the Contraction of the Liquid Vein issuing from an Orifice, and upon the Distribution of the velocities within it. By H. Bazin. Translated by John C. Trautwine, Jr., C. E. New York: John Wiley & Sons, 1896. 8vo, pp. 64.

The interest of this pamphlet, which is a translation of a paper presented by Monsieur Bazin to the Academy of Sciences of the Institute of France (on a date not mentioned) giving the details of the author's experiments on the velocities at different parts of the interior of a stream flowing through an orifice in the side or bottom of a vessel, is mainly as exhibiting the methods of observation of a trained scientific observer. In that view it is well worth the careful study of those who propose to make hydraulic experiments. As regards its value to the general practitioner, it is sufficient to quote from the report of the committee of the Academy, that it "realizes in many respects a very marked advance in our knowledge of the important and difficult question of the liquid vein." The translation is, as might be expected from the translator, in good clear English. All that is to be regretted is that the same notation is not used in all the tables. Some dimensions are in meters and some in millimeters, which is a little confusing sometimes, as all might have been given in millimeters. It is rather confusing too to have a certain ordinate designated by the letter *z* for the first 40 pages of the book and then to have 23 pages of tables in which the same ordinate is designated *a* in one column and *z* in another, without any explanation of the change. This will no doubt be corrected in the "second thousand" printed.

Tables Showing Loss of Head Due to Friction of Water in Pipes. By Edmund B. Weston, C. E. New York: D. Van Nostrand Co. 1896. 12mo., pp. 170.

This is a very useful little book for everybody who has anything to do with the determination of the sizes of pipes for conveying a certain amount of water. It is of convenient size and form, and the tables cover all sizes of pipes, from ½ in. to 60 in. diameter, under all prac-

licable, and a good many impracticable, heads. The figures given are derived from formulæ deduced by the author from numerous experiments on pipes, and may be considered fairly correct for new and smooth pipes. For pipes as they are found to exist in practice the tables give too great discharge. The instructions for extending the use of the tables beyond the limits are not clear, and to a person unused to formulæ would be confusing, while anyone who was accustomed to formulæ would never solve the hypothetical problems in the manner suggested. Some of the problems are absurd as they are put, such, for instance, as supplying water to a boiler from a reservoir 167 ft. above it through a pipe 100 ft. long; or discharging from a reservoir under 300 ft. head, through a 3-in. pipe 10 ft. long, no mention being made of the intermediate pipe, and no rule being given anywhere in the book for reducing feet of head to pounds of pressure. If the tables had followed the example of the first of their kind issued by Ellis & Howland in 1883, and contained a column of loss of head in pounds as well as feet, their general usefulness would have been greatly increased. The number of figures used in the book need not have been increased thereby, because the tables for the smaller size of pipe might as well be shortened. The discharge of $\frac{1}{2}$ -in. pipe under 700 lbs. pressure is rarely wanted. It is to be regretted that in the preface the author should have used the word *data* several times as a singular noun, after having once used it correctly in the plural number.

TRADE CATALOGUES.

The Light of Experience is the title given to a 15-page 6 x 9 in. pamphlet published by the Manhattan General Construction Co., of 44 Broad street, New York, and devoted to a description of the direct current enclosed arc lamps made by that company. The excellent half-tone engravings make the pages attractive, while the information contained in the carefully prepared printed matter will interest and instruct the reader. The larger part of the pamphlet is taken up with a description of the Standard incandescent arc lamp, which has many features radically different from existing types. In these lamps one pair of half-inch carbons will burn 150 hours. The double-closing alabaster globes act as a spark arrester and do away with shadows on the globes above and beneath the lamp. The Edison Electric Illuminating Co. reports a saving of \$12 a year on each lamp over the open-air arc lamps, and states that in one of the large stations this has reached as much as \$15 a lamp. This shows a saving of about 70 per cent. in labor in favor of trimming the Manhattan lamps. No spring or adjustment of any kind is used in their construction, and the entire moving mechanism consists of the armature, which is a solid piece of tool steel weighing $3\frac{1}{2}$ lbs., and the four clutched rings stamped out of brass. The outer globe of the Standard type is air-tight at all points except at the bottom, where a disc is fitted which is large enough to permit the globe to be cleaned and the lamp to be trimmed. A slight turn of a knob allows the lower carbon holder, the inner globe and the upper carbon to be withdrawn, the outer globe remaining stationary on the lamp. In the D. G. (drop globe) type the outer globe is lowered on two sliding rods, exposing the inner globe for trimming. The Junior arc lamps use $\frac{3}{8}$ -in. solid carbon, and are designed to burn 100 hours without attention, with a fuel consumption of 12 in. of carbon.

The Testing of Iron and Steel.

At the November meeting of the St. Louis Railway Club, Prof. J. B. Johnson presented a valuable paper under the title of "The Mechanical Properties of Wrought Iron and Steel, as Shown by Actual Tests." It was largely an exhibition of lantern slides, showing some of the machines used in the testing laboratory of Washington University and showing many test specimens; some results were represented also by diagrams. The comment on each of these slides was brief and would be of little interest without the pictures, which were mostly from a book on "Materials of Construction," now in preparation by Prof. Johnson. The introduction to the paper, however, we give in full, as below:

When the general adoption of the Bessemer process of making steel had led to its reduction in price, so as to become a competitor of wrought iron, and when it was shown that the usual mechanical tests revealed an equally soft and much tougher material, steel began to replace wrought iron in a thousand ways. And as it had never been found necessary to apply scientific tests to, or to make chemical analyses of, wrought iron, so it was supposed the steel could be purchased in the open market with equal security. An untold number of astonishing and unexplained failures of Bessemer steel in rails, boilers, axles, shafts, etc., has now thrown suspicion on all kinds of steel when used under the most trying conditions, and the object of this paper is to restore confidence in this material by explaining some of the causes of its failure, and by showing how to avoid them. It is now commonly regarded as more or less treacherous, but I shall hope to show that when purchased under the ordinary conditions as to inspection now prevalent in this country, and under reasonable specifications, neither of which limitations will appreciably increase the cost, a far more efficient and reliable material may be obtained, and at

less cost than would result from the continued use of wrought iron.

The conclusions offered in this paper will be based on actual tests, the geographical representation of many of which will be shown on the screen. But before beginning with these I wish to give my views concerning the endless controversy about the cold crystallization of iron and steel, in service, from shock, vibration, or what not.

Concerning steel little need be said in this connection besides the general fact that all steel, whether simply cast or cast and rolled while hot, is always and under all circumstances wholly crystalline. It always crystallizes in the process of cooling, and it cannot be obtained cold in any other form. When pulled apart in a testing machine, or bent cold in the full section and broken, it shows a fine, silky fracture, which leads to the impression that the structure is fibrous. This appearance is produced by the cold drawing out, and is not the normal molecular arrangement. When nicked or grooved by a V-shaped tool, and broken across, it always reveals a crystalline fracture.

Concerning wrought iron, however, the case is different. Its production from a puddle-ball is like the formation of butter in the bath of buttermilk, or like a sponge dipped in molasses, and when it is squeezed and rolled the adhering slag forms into separating sheaths about the nearly pure iron filaments, thus giving to the structure an essentially fibrous character. Each filament of pure iron is a series of very small and distorted crystals, but these are not visible to the naked eye. It is common, however, in the cheaper grades of wrought iron, to find on a broken cross-section large crystalline areas, and sometimes nearly the entire section presents this appearance.

There are three general causes of this crystalline structure: First, the so-called wrought iron may have been rolled from faggoted scrap, some of which was probably high-carbon steel, and this portion would show a crystalline fracture. Second, the puddle-ball may have been formed under too great a heat (a common fault), so that a portion of it had been actually melted, thus forming of this portion ingot metal or steel, which part would, when cold, be wholly crystalline. Third, the puddling process may have been incomplete, when, with a low fire, some of the unreduced pig iron would be removed with the ball, and this would form a coarsely crystalline portion of the final rolled bar.

Concerning the cold crystallization of wrought iron, however, my views are as follows:

I. The normal molecular arrangement of wrought iron is crystalline, but the thorough admixture of the inert slag in a well-worked product prevents these crystals from forming in visible sizes. The ordinary fracture, therefore, exhibits rather a lateral view of these finely crystallized threads, thus causing this to present a fibrous appearance.

II. From one or more of the three causes named above a large part of any so-called wrought-iron bar may be actually and coarsely crystalline from the time of its first cooling.

III. With the ordinary and more inferior grades of wrought iron now on the American market, it is very common to find large portions of the cross-sections of test-bars showing a crystalline fracture, even for tension test specimens of standard form. Much more, therefore, are such irons likely to have this appearance when nicked and broken across, or when nicked and pulled in tension.

IV. All wrought iron, when broken with extreme suddenness, will show a crystalline fracture. This is because time is not given for the drawing out of the section, rupture occurring directly across the fibers, so that the fracture shows only the end view of the same.

V. When a bar is nicked with a sharp chisel, or grooved in a lathe with a sharp-pointed tool, and broken across, rupture begins at one side without any elongation of the fibers, and extends from fiber to fiber across the section in such a way as to produce a result similar to that caused by an instantaneous rupture. In this way wrought iron will often show a crystalline or granular fracture, when, under the ordinary tensile tests, it would be wholly fibrous. All steel or ingot metal will always show a crystalline fracture when treated in this manner, although for the soft and medium grades of steel the fracture is always fibrous or silky when broken in tension, with the usual accompanying elongation and contraction.

VI. Much of the so-called wrought-iron on the market to-day consists simply of rolled faggots of "scrap-iron," a large portion of which is scrap steel. As these are heated only to a welding heat and then rolled into merchant bar there is no real mixing of the several metals and the several components form so many separate portions of the cross-section of the final rolled forms. The crystallized steely areas found in the fractures of most ordinary wrought-irons to-day can be largely traced to this source. Wrought iron railway axles and other large forms are usually made up in this way.

VII. When wrought-iron breaks in service, therefore, and shows a coarsely crystalline fracture it does not prove to my mind that crystallization has occurred in service. It proves only that this iron had such a structure originally. It, however, the rupture occurs in practice in a suddenly contracted area, as in a screw thread, or in a sharp angle, or if it has been produced with extreme suddenness, as in case of an explosion or shock of any kind, if the appearance of the fracture is finely crystalline or granular, this appearance may be wholly due to the method of failure. This is shown by the fact that if a specimen be cut from the adjoining metal and tested in tension with the standard form of specimen it may show a wholly fibrous fracture. In such case, therefore, the crystalline appearance of the fracture is due to the particular conditions as to shape of specimen and suddenness of rupture and not to any molecular change which has taken place in the iron.

VIII. The following is taken from the Annual Report of Tests of Metals, made at the United States Arsenal, at Watertown, Mass., for 1890, in which are recorded in many tests of specimens cut from the journals of old railway axles: "Wrought-iron axles have been examined which have had long-continued service, the journals of which showed incipient cracks, indicating that rupture had begun, and that further use must result in complete rupture. It is a remarkable fact that the tests of the

metal of these journals near their cracks showed no loss of strength or ductility. No indications of a tendency to crystallize were discovered, and inasmuch as the metal has gone through all the phases of deterioration up to the limit of actual rupture without showing a crystalline tendency, it is thought this demonstrates and proves that this material is incapable of cold crystallization when exposed to the conditions of service."

In one instance one of the old cracks, which had developed at the inner shoulder of the journal, reached to a depth of 0.02 in. into the side of the test specimen, and yet the specimen broke 2 in. from this section. After rupture the ends of the specimen ($1\frac{1}{2}$ in. diam.) containing this crack was bent cold 33 deg. with "this crack at the middle of the bend on the tension side, which opened the crack in width, and also developed numerous other cracks in the vicinity," but without rupture. All the tests showed fibrous fractures.

Some of the pictures showed micro-flaws in wrought iron and steel. These do not appear to greatly affect the strength in the ordinary tests, but for many thousands, or millions, of repetitions of a load about to the elastic limit they seem to be the primary cause of failure. The elastic working of the material gradually extends these flaws until finally it fails under perhaps a very much smaller load than it had previously carried.

Two of the views showed broken wrought-iron railroad axles. These were broken by bending back and forth under impact, one of them at a temperature of 30 deg. Fahr., the other at 18 deg. below zero. The latter broke under a less number of blows than the hot axle and it showed what would commonly be called a crystal line fracture, while the fracture of the specimen broken hot was fibrous. The cold break is really as fibrous as the other specimen, but it breaks sharply across, the fibres giving it the crystalline appearance.

Another view showed test specimens cut from a 16-in. shaft forged for a United States cruiser which failed soon after being put into service. This showed the bad effects of trying to forge large axles under light hammers. The test specimens all showed an ultimate strength of about 70,000 lbs. per square inch, but those toward the circumference of the shaft had an elongation of 21 per cent., a group further in 7 per cent., another group still further in 5 per cent., and those nearest the center showed but 2 per cent. elongation. Four specimens were cut from the other side of the shaft and forged down to the same size as the test specimens and when these were tested they all showed about the same elongation, namely 25 per cent. and about the same ultimate strength, which was now raised to 75,000 lbs., showing the result of forging, the whole set being the great argument in favor of hollow-forged shafting.

Prof. Johnson's general conclusions were as follows: As between steel and wrought iron for car and locomotive construction, I should say, always use steel where the material is not to be forged or welded. While no better structural material is made than the best grades of wrought iron, yet these are so expensive as to preclude their use for most purposes. As between the cheap wrought iron in the market to-day and mild steel of about the same price, the steel is so far superior as to stop all competition when the facts are known. It is important, however, to purchase all such material under carefully and intelligently drawn specifications, and to follow these with competent inspection to get the worth of the money expended for this raw material.

Cast-Welded Rail Joints.

BY WM. BAXTER, JR.

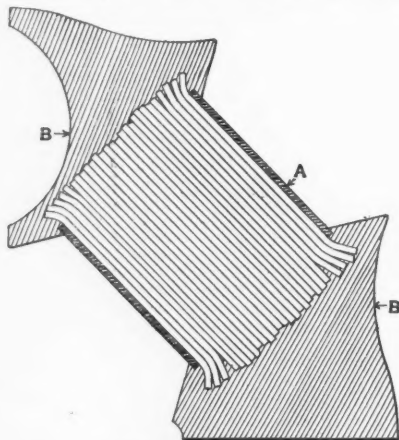
In the early days of electric development, the subject of a suitable connection between the ends of the rails did not receive the consideration it merited; the mechanical stability of any of the approved rail fastenings was thought to be sufficient, and it was believed that the metallic continuity required to afford a circuit of low resistance for the electric current could be easily obtained by the use of bond wires soldered to clips attached to the ends of the rails. Experience soon showed, however, that these conclusions were very far from correct, and that the joints were defective mechanically as well as electrically. The electrical weakness was the first to be discovered, and although numerous devices have been tried in order to remedy this defect, none has proved entirely successful up to the present time. The difficulty arising from the damaging the joints, by the pounding of the car wheels, has been greatly ameliorated by supporting the larger part of the weight of the motors on springs, and also by making them very much lighter. On roads where the heavy types are still in use, probably the only way to prevent the deterioration of the rail joints is to use a more substantial connection than has been employed in the past.

It is evident that metallic continuity of the rails will give the greatest strength; and also the greatest electrical conductivity, and the question naturally arises, How can this continuity best be obtained? There are two methods of accomplishing the result that are now more or less in use, one is that of electrical welding, and the other is cast welding. It is claimed by some that the later process gives metallic continuity, and by others that it does not. From the experience already acquired with this process, we must conclude that metallic continuity can and has been obtained; but that the successful accomplishment of the result in any particular case cannot be predicted.

In a paper read before the convention of the American Street Railway Associations at St. Louis, on "Track and Track Joints," by Mr. M. K. Bowen, Superintendent of the Chicago City road, much valuable information bearing directly upon this subject was given. He said in part: "Seventeen thousand cast-welded joints were made

on our road in 1895, and of those only 154 joints were lost. The joint in comparative tests has been found to be far stronger than the rail itself, and such breakages as have occurred were due to a flaw in the metal. Upon breaking a joint which has been well cast, three spots will usually be found where amalgamation has taken place between the rail and the cast portion, one on each side of the web and one on the bottom. These spots are from 1½ in. to 2 in. in diameter. There has been some discussion as to its being a bond for carrying electric currents. I cannot recommend it with certainty, as there are occasional joints which I have taken off where no amalgamation has taken place whatsoever, thus destroying the effect as a bond of all the other joints in that line of track. To overcome this difficulty I have adopted the plan of bonding all joints. However, future experiments and care in the casting of the joints may develop their efficiency as a bond."

These remarks show that although perfect results are not obtained in every case, amalgamation of the metals actually takes place. Since this much has been demon-



A Cast-Welded Joint.

strated by the actual experience of the past, to obtain perfect joints in every case all that is necessary is to discover the cause of failure and remove it. An investigation of the process now employed may serve to reveal some of the features that tend to prevent the amalgamation of the surfaces in some joints.

The plan adopted for making the joints, according to Mr. Bowen, is as follows: The ends of the rails are scraped, or filed off, so as to present a bright metallic surface to the molten metal. A cast-iron mold is placed around the joint, it being made so as to fit tightly against the rail, thus preventing the metal escaping from the mold. If the rails are allowed to move freely they are bent out of line by the expansion of the lower edge, as the molten cast-iron does not cover the whole of the rail, only reaching to the underside of the tread. To avoid this they are sprung slightly in the opposite direction and are held firmly in that position. The metal is then poured in, and as the cast-iron mold chills off the part that comes in contact with it, the outer surface of the casting sets first, thus forming a crust within which the molten metal is retained. As this crust contracts faster than the interior, the latter is forced up against the rails, and, according to the theory, a more perfect contact is insured.

Some years ago the writer sought to amalgamate the surfaces between cast and wrought iron and the experience thus acquired leads him to believe that the method of casting joints now in use can be improved. A process that will cause the amalgamation of cast and wrought iron should certainly accomplish the same result when steel is substituted for the wrought iron, since steel and cast iron are nearer alike.

The experiments referred to were made with a view to constructing a field magnet for electric motors and generators, using wrought iron cores and cast-iron ends. This was before the days of steel castings. The castings were of the shape shown in the accompanying sketch, A being the wrought iron and BB the cast ends. The wrought iron part consisted of a piece of iron boiler tube of the desired diameter, filled with wire running lengthwise and long enough to project an inch or so beyond the ends of the tube. The ends of the wire were spread out so as to allow the molten metal to run in between them, the idea being that in this way the wires would become more easily heated to the welding point. In the first castings made, the scale of the wire was removed by means of a weak solution of acid, this acid being washed off thoroughly with a strong alkali water. The results obtained were not satisfactory. On breaking the castings it was found that only a few of the wires that were separated from the others had welded, and this led to the conclusion that the cause of failure was that the body of wrought iron was so great that it cooled off the cast iron before the ends of the wire could become hot enough to amalgamate and that the remedy was to provide means whereby the temperature of the molten metal could be kept up, so as to raise the wires to the welding point. To accomplish this result, the mold was made with an overflow chamber large enough to hold three or four times the amount of metal required for the casting. The castings made with this improvement were better, but not wholly satisfactory; a greater number of wires amalgamated, but these were all separated

from each other, and thus were sufficiently exposed to the molten metal to become heated to the welding point. At this stage in the experiments it was concluded that removing the scale from the wire was a mistake, and that if it were left on an action would take place similar to that in the process of making Bessemer steel, that the oxygen in the scale would unite with the carbon in the cast iron, and by the heat so generated, the temperature would be raised in the vicinity of the wires, if not to the welding point, at least much nearer to it than by the process previously tried of running through an extra amount of metal. Having started upon this line of thought, it was naturally suggested that the substitution of rust for scale would give still better result because the scale, which is the black oxyd of iron is not so rich in oxygen as rust.

In order to provide the rust in place of the scale, the ends of the wires were treated with a solution of acid as before, but instead of washing it off, it was allowed to remain, and after a few days the ends of the wires were coated with a heavy coating of rust. The castings obtained in this way were very far superior to those previously made, and demonstrated clearly that the action anticipated actually took place. Further experiments showed that the greater the amount of rust on the wires, the better the results. In the first castings made by this process, the overflow chamber was not used, and investigation revealed the fact that although a weld had taken place between the cast iron and the wire at points where the ends were close together, it was not complete, but only in spots that collectively would not amount to more than a quarter of the entire surface. As amalgamation took place at points where it previously had not, the only conclusion that could be arrived at was that the combustion of the carbon had raised the temperature at these points, but that the combustion was not sufficient to heat the entire surface to the welding point. In the next castings the amount of rust was increased, and the overflow chamber was provided, the object of this being to insure a sufficient supply of carbon to take up all the oxygen, and thus leave a clean metallic surface exposed. In these castings the results were very much better, although a complete amalgamation of the whole surface was not obtained in this or in subsequent experiments. This may have been due to an attempt to use the molten metal sparingly at the foundry. Many castings of this kind were made, and the fact that the quality was improved from time to time by urging the foundryman to run more metal through the mold left a strong conviction that the gradual deterioration was due to a gradual reduction in the amount of metal that was allowed to overflow.

In the opinion of the writer, if cast welded joints were made in accordance with the process outlined in the foregoing, an amalgamation of the greater part of the surface could be obtained in every case. It is not at all probable that any metal would have to overflow because, according to Mr. Bowen, the cross-section of the rail is about one-eighth of that of the casting, and this being the relative proportion of the cold to the hot metal, there would be abundance of heat, as well as carbon, to produce good results. In order to retain the heat as long as possible, it would be advisable to line the mold with some good non-conductor, such as asbestos, which would prevent the reduction of temperature and also allow the casting to set free from internal strains. The scale can be removed from the ends of the rails by washing them with a weak solution of either sulphuric or muriatic acid. By scrubbing with a wire brush, the scale can be removed much sooner than by the unaided action of the acid. When a clean metallic surface has been obtained, the acid should be wiped off and the rails allowed to stand a few days before the casting is poured, so that they may become well coated with rust. If a good weld is obtained it is evident that pins through the holes in the ends of the rails would add little, if any, to the strength of the joint; but if it is desired to use them, so as to insure safe results, they should not be put in place until after the rails have been treated with the acid; and to render them as effective as possible, the holes should be cleaned out with a reamer and the pins made taper and forced in tight.

In the discussion which followed the reading of Mr. Bowen's paper it was brought out that in some places the workmen were not very thorough in the process of scraping the scale off the ends of the rail and one, when spoken to about it, said that it did not make much difference whether the rails were very bright or not, and in all probability he told the truth, for even the dense scale can be decomposed by the affinity of the carbon in the molten cast iron, although with nothing like as much ease as the rust in which the chemical bond between the iron and the oxygen is much weaker. The fact that amalgamation takes place even to a slight extent in the process now used would seem to be an indication that by the method herein outlined a sufficiently extended surface would weld, in every case, to insure electrical conductivity and mechanical strength equal to that of the rail itself; for if amalgamation will take place between the molten cast iron and the bright surface of the rails, in the face of the fact that the metal is cooled off by the mold, it is certainly reasonable to suppose that it would do so to a much greater extent when the cast iron has been brought nearer to the same composition as the steel of the rails by the decarbonizing action of the oxygen, especially as the metal would be kept hotter by the prevention at radiation as well as by the generation of heat due to the combustion of the carbon.

TECHNICAL.

Manufacturing and Business.

A committee of the creditors of the Memphis Car & Foundry Co., said to represent about 80 per cent. of the outstanding claims, have asked the Court to postpone an order for the sale of the company's property, pending the perfection of the plan looking to a re-establishment of the plant on a sound basis without a sale.

The Cumberland Valley has purchased a Russell snow plow, the first ever owned by that road.

The Baltimore & Ohio has ordered a new coal-dumping machine for the Cleveland Terminal & Valley, at Cleveland, to cost \$50,000.

The Berlin Iron Bridge Co. is to erect a runway for a 20-ton electric traveling crane in one of the new buildings of the Ludlow Valve Manufacturing Co., of Troy, N. Y. The runway is 160 ft. long and the track is supported by heavy steel columns and girders. The crane has a clear span of 55 ft.

The 300 St. Louis & San Francisco, 100 Armour and 50 Texas Midland cars being built by the St. Charles Car Co. will have More, Jones & Co. bearings.

Arthur Ingraham has been appointed Receiver of the railroad contracting firm of Warren, Jenks & McNeely, of New York City, which built the Hendersonville & Brevard Railroad in North Carolina in 1895. A disagreement between Mr. Henry M. Warren and Arthur E. Jenks on one side with Mr. Thomas C. McNeely, the third member of the firm, as to the disposition of its assets, seems to have been the direct cause of the receiver ship. The two former members brought the suit for the dissolution of partnership in the New York Supreme Court under which the receiver was appointed.

Iron and Steel.

The Oliver Mining Co., of which the Carnegie Steel Co. and the Oliver Iron & Steel Co. are the principal stockholders, has secured a 50-year lease of the Mountain Iron mine. The capacity of the mine is said to be about 500,000 tons annually. The Oliver Mining Company also operates the Big Oliver mine on the Mesaba range, which during the season just closed shipped about 800,000 tons of ore.

The Bethlehem Iron Co., of South Bethlehem, Pa., is remodeling its Bessemer plant and rail mill. Preparations are being made to cast on cars. A set of three heating furnaces, with charging and drawing machinery, has also been put in.

On Dec. 19, 100 men employed in the converting mill of the Carnegie Steel Co. at Duquesne were dismissed because of the introduction by the company of the direct process of steel-making.

The steel plant of the Youngstown Steel Co. at Youngstown, O., is to be put in operation about the first of the new year.

The open-hearth steel department of the Cambria Iron Co. at Johnstown, Pa., is being overhauled and considerably enlarged.

Two furnaces of the Dayton (Tenn.) Coal & Iron Co., which have been shut down since last September, are to be blown in within a few days. A large force of men is now at work overhauling the furnaces and both will be placed in first-class condition.

New Stations and Shops.

Profiles and a ground plan have been prepared for the new station to be erected by the Gulf, Colorado & Santa Fe at Galveston, Tex. It is to be four stories high, with the ticket offices, waiting-rooms, express and baggage offices and dining-rooms on the first floor; the other three stories are for the use of the general offices. The building is to be of pressed brick and stone.

Grading has been begun at Terrell, Tex., on the yard tracks to be used in connection with the new shops of the Texas Midland Railroad located there. The contract for the buildings will be closed within a few days. The main shop is to be 70 x 90 ft.; car shop, 40 x 90 ft.; paint shop, 60 x 200 ft.; blacksmith shop, 40 x 80 ft. In addition to these buildings a five-stall roundhouse is to be erected.

The Hyde Park Street Railroad Co., of Hyde Park, Mass., is erecting a power station, the steel work of which has been designed and will be erected by the Berlin Iron Bridge Co. The boiler room is 44 ft. x 87 ft., the engine-room 56 ft. x 115 ft., the building having brick walls and steel trusses supporting the roof. The steel work in the power plant for the Brockton Street Railway, at Brockton, Mass., is also to be built by the Berlin Iron Bridge Co.

The Young Reversible Nut Lock Co. is erecting a plant 150 x 50 ft. at Minooka, Pa.

Hollow Forged Steel Shafts.

The Bethlehem Iron Co., of South Bethlehem, Pa., has recently invaded a new field with its hollow forged shafts. It has been introducing them on the Mississippi and Ohio rivers for stern-wheel steamers. Last week it closed a contract with the Pittsburgh & Cincinnati Packet Line for a hollow forged nickel steel oil-tempered shaft, 38 ft. 9 in. long, 14 in. outside diameter, with a 7-in. hole through it. Such a shaft is 3,500 lbs. lighter and 3½ times stronger than the solid wrought-iron shaft which would ordinarily be placed in such a vessel. This shaft goes into the new vessel which these people are having built at the Cincinnati Marine Railway, Cincinnati, O. The Bethlehem Iron Co. recently sold a shaft to C. Jutte & Co., of Pittsburgh, Pa., and is also arranging to put a similar shaft into the new

steamer which the Mississippi Valley Packet Co., of New Orleans, La., will shortly have built. In a paper recently read before the Western Society of Engineers, and printed in our issue of Nov. 13, Mr. H. F. J. Porter, General Western Sales Agent of the Bethlehem Iron Co., spoke of these hollow-forged shafts, and said that as compared with a wrought-iron shaft, 14 in. in diameter and 30 ft. long, whose strength would be taken as unity, a solid steel shaft would be $\frac{1}{2}$ stronger. A solid nickel steel shaft would be $1\frac{1}{2}$ times stronger. A steel shaft of the same outside diameter, with a $3\frac{1}{2}$ in. hole through it and oil-tempered, would be twice as strong. A hollow nickel steel shaft of the same type would be three times as strong. A hollow forged steel shaft of the same weight, but of 22 in. outside diameter and with a 17-in. hole through it, would be three times as strong, and if oil-tempered $4\frac{1}{2}$ times as strong. If made of nickel steel it would be six times, and if oil-tempered eight times as strong.

Locomotive Boiler Jackets.

The following circular of inquiry has been issued by the Committee of the American Railway Master Mechanics' Association on Boiler Jackets:

"Which is the most economical, a boiler jacket of planished iron or a boiler jacket of common sheet iron or sheet steel painted? The general appearance, first cost and cost of maintenance to be considered."

The committee desires to obtain all possible information relative to first cost, cost of application and average yearly cost of maintenance of planished iron, sheet iron and sheet steel jackets on locomotive boilers. To this end, therefore, will you kindly give us the cost of these three items, also the average life of jackets, based on your experience or best judgment?

1. How often do you find it necessary to paint steel or sheet iron jackets?
2. What color and quality of paint do you use, and what is the cost per square foot, labor and material included?
3. Do you think it advisable to paint inside of jacket before applying? If so, please give your reasons for so doing, and state kind of paint used.
4. From your experience, do you find that jackets wear out from external abrasion or from inside rusting, or both?
5. From your experience, what do you consider the average life of planished iron jackets when used over wood lagging?
6. When a boiler covering other than wood is used under a planished iron jacket, have you found that the life of the latter is influenced thereby? If so, to what do you attribute the influence?
7. Excluding cost of material, what is the cost per square foot of (a) planished iron jacket, (b) sheet iron jacket, (c) sheet steel jacket, jackets being secured by bands as in ordinary practice? (If you secure your jackets otherwise than by bands, please state separately the cost of arrangements to which jacket is attached, and furnish blue prints of same).
8. What is the cost of material per square foot of (a) planished iron, (b) sheet iron, (c) sheet steel?
9. What thickness of material is used and what gage do you employ in measuring same?
10. Do you find the effect of the acid-laden moisture which drops from the roof of roundhouses more injurious to plain iron and steel jackets than to planished jackets, and to what extent does this cause of deterioration affect the renewing and repainting of jackets?
11. Do you find the jackets placed over magnesia or asbestos laggings run away more rapidly than jackets placed over wood lagging, and are plain iron or steel jackets more susceptible to this effect than are planished iron jackets?

Reply should be sent to T. B. Purves, Jr., Boston & Albany Railroad, Springfield, Mass., not later than April 1, 1897.

Proposed Power-Plant at Massena, N. Y.

Surveys have been made, plans drawn and preliminary work perfected for the construction of a power plant capable of developing from 100,000 to 200,000 H. P., near Massena, St. Lawrence County, N. Y., by the St. Lawrence Power Co., which was incorporated on May 9, 1896. It is stated that those interested have acquired in all 1,800 acres of land for the proposed construction and that the necessary capital has been secured. Massena is situated about eight miles from the St. Lawrence River, and is on the lines of the New York Central and Grand Trunk railroads; and the topography of the country is such as to permit of the building of the plant at a reasonable cost. The present plan is to build the mills in the valley beside the river, giving a total fall of water of about 40 ft., the supply being by direct pipes from the canal and the tail races from the Grass River. Messrs. Stewart & Co., of 40 Wall street, New York, are the owners. John Bogart is Consulting Engineer and Lieutenant James Patten is designing the electric apparatus for the plant.

THE SCRAP HEAP.

Notes.

On the Norfolk (Va.) City Street Railroad a car to be used open in summer and closed in winter is being tried. It was designed by Benjamin Lowenberg.

Of the 22,000 employees of the Illinois Central, over 1,200 have accepted the company's offer to sell to them shares of stock in the road, to be paid for in small monthly installments.

An Indianapolis paper says that Government inspectors are watching the baggage cars in that region to see if railroad letters are unlawfully carried without the payment of postage.

A correspondent informs us that the experimental farms which the Seaboard Air Line is to establish are to be long and narrow and close to the track, so that, as an object lesson, they will be available for passengers and "home seekers" as well as for the local farmers.

The Illinois Central freight house at Jackson, Miss., was burned on Dec. 20; loss, \$75,000. A similar fire at Sault Ste. Marie, Mich., Dec. 19, caused a loss of \$30,000, seven freight cars being burned. In Brooklyn, N. Y., on the 18th, a car house of the Nassau Street Railroad Co. was burned, together with 10 cars. Total loss, \$38,000.

On Nov. 21 a special officers' train of the Seaboard Air

Line was run from Weldon, N. C., to Portsmouth, Va., 76.8 miles, in $72\frac{1}{2}$ minutes. The engine, run by Engineman Heilig, was No. 540, built by the Richmond Locomotive Works. It weighs 50 tons, and has cylinders 19 in. \times 24 in. Speed had to be slackened at one bridge and through three villages.

The City Council of Chicago, on Dec. 15, voted by a large majority to compel all street railroads of the city to carry passengers for four cents each, but on the 21st the ordinance was vetoed by Mayor Swift. The employees of the principal lines held meetings and appealed to the Aldermen to repeal the vote, asserting that the reduction, if enforced, would result in a reduction of their wages.

Several passengers in a reclining-chair car of an express train of the Missouri, Kansas & Texas were robbed near Sedalia on the night of Dec. 16. The robbers escaped from the train just before it entered Sedalia. A train robbery was reported from Bryant, Ala., on the Southern Railway, Dec. 17. Westbound passenger train No. 2, on the Southern Pacific, was stopped by three masked men on the night of Dec. 21, near Comstock, 208 miles west of San Antonio, Tex. Some money was taken from the express car.

Pittsburgh papers report that the officers of Allegheny City have substantially reached an agreement with the Pittsburgh, Fort Wayne & Chicago Railroad to raise its tracks for a considerable distance through the city, abolishing grade crossings at all the streets except Federal street. The proposed work will cost \$1,500,000 or more. Work is not likely to be begun before next summer. Boston papers report that the Boston & Albany has prepared plans for elevating its main line through South Framingham, work to be begun some time next year. An important street grade crossing would be abolished. The crossing of the track of the Old Colony Railroad is near the same crossing.

A Car Burned.

The combination express and mail car attached to train No. 103, of the Chesapeake, Ohio & Southwestern branch of the Illinois Central, due to arrive in Memphis at 7:40 o'clock, was burned at 4:08 a. m., Dec. 10, at Trimble, Tenn. Ten pieces of baggage, six hunting dogs and sixty packages of letters were consumed. An oil lamp exploded while the express and mail messengers were in a forward car. A considerable part of the baggage and mail was saved.

An Acetylene Explosion.

Cablegrams from Berlin state that an explosion occurred on Saturday, Dec. 12, in the house of a scientist, George Isaac, who was experimenting with the manufacture of acetylene gas. Isaac and three assistants were killed. This is but one of several serious acetylene explosions that have occurred within a few months. The explosion at New Haven, costing three lives, is still fresh in mind. A more recent accident in a cafe at Lyons wrecked a building, killed two persons and injured several others, while the explosion of a cylinder of liquefied acetylene in the Paris laboratory of Raoul Pictet, resulted in the death of two workmen, the demolition of the gasometer building and great damage to the neighboring property. Yet in spite of such casualties, it is reported in the daily press that street railroad companies are considering the use of acetylene for lighting their cars. While so many conflicting theories as to the nature and properties of acetylene are exercising scientific minds, and while the laws governing its explosiveness are so imperfectly understood, it is difficult to believe that any railroad company would for a moment seriously consider the use of acetylene for lighting its cars.

A Decision for the Morris Box Lid Co.

In the United States Court, District of Delaware, at Wilmington, a decree in the case of the Morris Box Lid Co. against the Davis Pressed Steel Co. was issued in favor of the former, to the effect that the complainant has sustained and proven every material allegation of its bill of complaint necessary to entitle it to the relief prayed for, and that the cause is hereby referred to a Master, to ascertain and report to the Court the amount of damages due to the complainant arising out of the infringement of said Letters Patent by the defendant company. A writ of injunction will be issued directed to the Davis Pressed Steel Co., their officers, agents, employees and legal representatives enjoining and restraining them from making, using or selling any of the steel pressed lids in the infringement.

A Few Loads of Lumber.

The *Northwestern Lumberman*, quoting from the *Liverpool Times*, states that nine shiploads of Oregon fir, about 11,000,000 ft., are being shipped from Port Blakeley, on Puget Sound, to Plymouth, England, to be used in the construction of a dry dock. There are in this lot of timber, besides ordinary sizes, over 10,000 pieces, ranging from $11\frac{1}{2}$ in. to 24 in. square, and from 45 ft. to 83 ft. long. The *Northwestern Lumberman*, in connection with this item, notes two big things: First, that a dry dock requiring this quantity of lumber must be very large, and, second, that "nowhere else on the round globe" can such a lot of lumber be found contiguous to deep water.

Cuba Libre.

A Chicago paper says: "Captain-General Heafford, of the Chicago, Milwaukee & St. Paul, has crossed the trocha, so to speak. Alive to the topics of the day, he is out with a circular in which he advises volunteers en route to Cuba that his road will carry guns, ammunition and dogs free; and on personal application Mr. Heafford will be pleased to drop all business and explain to possible volunteers the art of war and anything about international law that they do not understand." We are afraid Mr. Heafford is a trifle rash, although he thinks, doubtless, that he has ample experience to warrant this offer to break the excess-baggage agreement. The dogs and guns that he carries to the Northern Wisconsin hunting grounds may be pleasant and interesting things to have in a baggage car; but what will he think when he has to carry the dogs of war, such as Bill Chandler would offer him?

Reasons for not Reporting to the Interstate Commerce Commission.

Four small railroads in Florida, against which the Interstate Commerce Commission has secured mandamus for failing to make annual reports, have filed

their answers in the United States Court at Jacksonville. One of them has done no business during the year and the others set up the answer that none of their business is interstate. The Tavares & Gulf states, in addition to this reason, that owing to the destruction of fruit and vegetables by frost two years ago it has been unable to pay expenses, and it was not deemed right to engage the necessary clerical force to keep the records required by the Interstate Commerce Commission; and finally, as the property is one of private investment, and as it has never been a source of profit, but of heavy annual loss, the publication of its private affairs would operate against its interests, and might affect the value of its bonds and of its property.

The St. Louis, Kennett & Southwestern has made answer to a similar complaint in the United States Circuit Court at St. Louis. The company denies that it is a common carrier of interstate traffic, no freight being billed through to or from any other road. And, further, the road was in the hands of a Receiver for about three months, and the Receiver has not paid over \$1,455 as ordered by the Court. For the lack of this money the report required by the Commission cannot be made.

Pooling of Railroad Earnings.

The *Buffalo Courier* of Dec. 13 prints a brief history of railroad pooling, written by Mr. C. C. McCain, now Commissioner of the Association of Lake Lines and formerly Auditor of the Interstate Commerce Commission. Mr. McCain was for 10 years in the office of the Commissioner of the Trunk Line Association, which place he left to go to Washington. The earliest railroad agreement that he cites is one made by the presidents of the New York Central, the Erie, the Pennsylvania and the Baltimore & Ohio in September, 1858. The conditions necessitating a conference for the restoration of rates were precisely the same then as they have been a hundred times since, and the "unregulated competition, lack of harmony," etc., of those times are described, in the phrases quoted by Mr. McCain, in nearly the same words that are so familiar now. Mr. McCain is unable, however, to find any record to show whether the conference of 1858 amounted to anything; and the next thing of the kind that he finds is the formation of the Trunk Line Association in 1877. He does not describe the numerous agreements made between 1877 and 1886, and goes on to discuss the Interstate Commerce Law, recommending that it be amended so as to permit pooling. The Patterson bill should be passed, Mr. McCain reminds his readers that pooling is not the evil thing it is painted, being practised in other countries even where the railroads are owned by the Government. The testimony of merchants and others before the Congressional committees in 1895, and the action of the New York Board of Trade and Transportation, convince Mr. McCain that nine-tenths of the commercial interests of the country agree in demanding the abolition of the anti-pooling law.

The Pacific Railroad Funding Bill.

There is some chance of Congress taking action on the Pacific Railroad indebtedness at the present session of Congress. The matter has been before the House since the opening of the session, and last week a resolution was adopted with little opposition providing for the consideration of the refunding bill immediately after the holiday recess. Under this resolution the bill will be a special bill before the House four days, beginning Thursday, Jan. 7. Well-informed opinion is that the bill can be easily passed in the House of Representatives. The chances of its passing the Senate are uncertain on account of the unlimited debate which might be precipitated. The Senate Committee has already declared in favor of the pending bill.

The Uganda Railway.

Upwards of 40 miles, from the coast inland, of this line in Africa have now been laid, and it is expected that by the beginning of next year 100 miles will be open for traffic, and that 25 miles will be completed each succeeding month.

The Nebraska Grain-Elevator Case.

The *Omaha World-Herald* says that the recent decision of the United States Supreme Court, holding that a railroad is not bound to build a connecting track to every grain warehouse which asks for such a convenience will tend to confirm an injurious monopoly: "The theory on which the farmers who instituted the complaint, and the State Board of Transportation and the Nebraska Supreme Court proceeded, was that proper elevator facilities are only a part of the shipping facilities which the railroads are bound to supply to the public without discrimination. The United States Supreme Court seems to take the ground that elevator privileges are something apart from the necessary shipping facilities which all common carriers are required to furnish the public."

"Does not the decision give to railroad companies the power to absolutely control other business than that in which their charters permit them to engage? In other words, does not this decision give to the railroads the power to monopolize the grain business along their lines. If there is a disposition on the part of the railroads to go into this kind of a deal with elevator men, there is abundant backing given them by the decision. It has been known for several years that certain elevator firms were absorbing all the business along certain lines of road. It is also well known that some concerns which a few years ago operated a dozen elevators are now running 75 to 100. The individual elevator men who ran one or two elevators are being rapidly driven out and the business consolidated in the hands of a few big firms."

The Old Point Comfort Conventions.

The lessee of the Hygeia Hotel at Fort Monroe requests us to say that he is ready to assign rooms at that hotel to be occupied during the conventions, at any time, either for members of the associations or to the supplymen.

Lake Notes.

The finest car ferry yet put into service on the lakes, where this form of vessel is becoming very common, is the *Pere Marquette*, built for the Flint & Pere Marquette road, and just launched at Bay City. The vessel is 351 ft. long, 56 ft. beam, and 36 ft. deep. It will carry 30 loaded cars and 200 tons of fuel on a draft of 14 ft., at 15 miles an hour. In order to resist ice, the steel plates of the vessel are $1\frac{1}{2}$ in. thick for 60 ft. back from the bow, and all the ship is very heavy, over 2,700 tons of steel entering her hull. She will be driven by twin screws and double compound engines.

LOCOMOTIVE BUILDING.

The Buffalo, Rochester & Pittsburgh will soon put in service a heavy mogul engine intended for use on its western division over the heavy grade between Clarion

Junction and Mt. Jewett. The engine weighs 184,000 lbs. without tender and 267,000 lbs. with tender. The parts were constructed at the Brooks Locomotive Works, the engine being erected at the Lincoln Park shops of the railroad near Rochester. It is said that five other engines of the same type are to be built.

The Chesapeake & Ohio has confirmed the order to the Richmond Locomotive Works for six heavy compound engines which was originally made prior to the election, and was subject to McKinley's success. The engines will be built upon designs made by Mr. W. S. Morris, Superintendent of Motive Power, and are known as Class G-5, consolidation compounds. They have cylinders 21-in. and 33-in. x 24-in., 50-in. driving wheels, and with a boiler 62 in. in diameter at smoke-box end.

CAR BUILDING.

The Armour Packing Co. has contracted with the St. Charles Car Co., of St. Charles, Mo., for 100 beef cars, February delivery.

The Cold Blast Transportation Co., of Kansas City, Mo., has asked for bids on 100 refrigerator cars, which it is expected to build very soon.

The rumor that the Nashville, Chattanooga & St. Louis road would order additional freight equipment turns out to be without any basis.

The Missouri Car & Foundry Co., of St. Louis, has been awarded the contract by General Manager Greene, of the Baltimore & Ohio, for 1,000 cars for the Fairport Dock & Warehouse Co.

BRIDGE BUILDING.

Bridgeport, Conn.—The New York, New Haven & Hartford is reported to have received permission from the War Department to build a drawbridge over the harbor, about 300 ft. south of the present bridge. F. S. Curtis, Chief Engineer.

Brown's Station, O.—The Cleveland & Pittsburgh will build a new stone arch bridge over Island Creek, at this point, in place of a stone arch which has been in use many years. The tracks have been removed to temporary trestles, and the work of tearing down the old bridge has been begun. The new bridge will have a span of about 40 ft. and the foundations will rest upon bed rock.

Butler, Pa.—The Court has ordered the Pittsburgh & Western to build an overhead bridge on Lookout avenue by March 1, 1897.

Elkins, W. Va.—The Court of Randolph County, W. Va., has ordered the erection of an iron bridge across Leading Creek, near Montrose, on the line of the Leading Creek and Buffalo Turnpike. The bridge will be about 80-ft. span, with masonry foundations. The same authority has ordered a similar bridge built across Craven's Run on the line of the Beverly and Fairmount Turnpike, between Elkins and Leadville.

Hartford, Conn.—City Surveyor Bunce has reported that an iron bridge, 32-ft. roadway, with two 6-ft. walks, can be built across the Park River at Broad street for about \$16,000. There would be a concrete roadway with asphalt surface. Mr. Bunce was instructed to obtain plans and estimates from several concerns for an iron bridge in accordance with his report.

Helena, Mont.—Sealed proposals will be received at the office of the County Clerk until Jan. 13, 1897, for the building of an iron or steel bridge across the North Fork of the Dearborn River, about 30 miles from Wolf Creek, the nearest railroad station. The bridge is to have a 16-ft. roadway, main span to be a 160-ft. deck bridge, resting on tubular iron piers, 22 and 28 ft. long, approaches to be three 30 ft. plate girder spans, resting upon steel posts and masonry. Bidders to furnish plans, specifications and strain sheets. J. S. Tooker, County Clerk.

Lexington, Mo.—The United States Senate has passed a bill extending the time for building a bridge across the Missouri River at this point.

Menominee, Mich.—The contract for building the new Menominee and Marinette bridge, across the Menominee River, has been awarded to the Wisconsin Bridge & Iron Co., Milwaukee, the lowest bidders, the price of the steel structure of 15 spans complete with tubing and piling and superstructure being \$9,599. Of this amount Menominee pays \$8,584 and Marinette \$1,015. The new structure is to be erected according to specifications and plans furnished by the City Engineer, and must be completed April 1. The work will begin at once.

Niagara Falls, N. Y.—It is stated that the Erie will build a new bridge over Gill Creek.

Niagara Falls, Ont.—The first piece of steel, a skew-back bed plate weighing 46,170 lbs., in the construction of the new arch bridge for the Grand Trunk, was placed in position week before last. There will be another such shoe placed on this side and two on the American side.

Philadelphia, Pa.—At a recent meeting of the Board of Surveyors the ordinance providing for the revision of the city plans of the Twenty-fifth Ward was favorably recommended to Councils. Among other things the bill authorizes the widening of Butler street to 80 ft. from Sepviva street to Frankford avenue and a revision of the grade so as to provide for a bridge over Butler street on the line of the Philadelphia & Trenton, Pennsylvania lines. The entire improvement is contingent on the railroad agreeing to build the bridge and to dedicate such parts of its land as may be necessary for the change in the plan.

Pittsburgh, Pa.—Director Bigelow has advertised for bids for rebuilding the Point bridge. The plans were prepared by Mr. John Brunner and the cost of remodeling will not exceed the original estimate of \$100,000. The engineer will prepare plans for repairing the Tenth street bridge as soon as the Point structure is finished.

In the construction of its proposed river line the Glenwood Railroad Co. will build overhead bridges at Hazlewood avenue, Lowry and Rutherglen streets.

Red Bank, N. J.—The Monmouth County Board of Freeholders has awarded the contract for the new Manasquan River bridge to the Berlin Iron Bridge Co., at \$41,019.

St. Louis, Mo.—It is stated that plans for a bridge on Clark avenue, making a roadway over the railroad tracks from Eighteenth to Twentieth streets, have been submitted to the Board of Public Improvements by Commissioner Milner of the Street Department. They

are drawn, the officials think, to comply with the requirements of the ordinance ceding the street to the builders of the Union Station, who will have to contribute \$150,000 toward the cost of the bridge. The engineers estimate that the bridge will cost \$225,000, of which the city will have to pay \$75,000. The approaches run at right angles with the roadway of the bridge, and if the structure be built in accordance with the plans now in view it will be necessary to cut off a portion of the shed at the southern end of the Union Station, which now projects over the ground formerly occupied by Clark avenue.

Washington, D. C.—A bill to authorize the construction of a railroad bridge across the Sabine River between Louisiana and Texas has been reported and passed by the Senate.

RAILROAD LAW—NOTES OF DECISIONS.

Carriage of Goods and Injuries to Property.

In Pennsylvania it is held that a custom of a railroad not to notify consignees of the arrival of goods at a station where there was no freight agent will not relieve the company from liability for injury to goods after their arrival at such station, where the consignee was not notified.¹

In the same case it is held that a railroad is liable for injury to lumber through exposure to rain at the station to which it was delivered, where notice of its arrival was not given to the consignee.²

In Ohio where it appeared that defendant's baggage agent went to the hotel where plaintiff's traveling agent was, to inquire about his baggage, and saw, or might have seen, the contents of the trunk, consisting of valuable merchandise spread out for exhibition, and that such merchandise was afterward placed in the trunks, which were of a peculiar pattern, known as "jewelry," and these trunks were carried to the depot where the baggage agent received and checked them, it should have been left to the jury to determine whether such agent had knowledge, when he checked the baggage, that the same contained valuable merchandise.³

In Connecticut it is decided that where a carrier received baggage for transportation, mistakenly supposing that the owners thereof had purchased tickets over its road, when in fact they had purchased tickets over another road, it owed to the owners the duty only of abstaining from anything amounting to willful or wanton injury to their property while in its possession, and were hence not liable for its destruction, caused by attempting to run the train in which it was placed upon a bridge, which was so defective that it could not sustain such a burden.⁴

In Arkansas where a railroad closes a trestle in its roadbed, and thereby fills a ditch, through which the adjacent landowners had acquired an easement of drainage before the company acquired its right of way, and neglects to place a culvert under its roadbed to carry off the water as before, it is liable for resulting damages to the lands.⁵

In Ohio it is held that where the agent of a railroad receives baggage knowing, or having reason to know, that it is not the personal baggage of the traveler, but that it contains merchandise, the company will be bound, as a common carrier, to transport such baggage safely to its destination.⁶

In Kansas it is held that the fact that the railroad collected an excessive freight rate at the destination of the stock shipped does not show fraud in the execution of the shipping contract, and such contract is not invalid because of such overcharge.⁷

In the same state it is held that when a person takes passage upon a railroad, purchases his ticket and checks his baggage to the place of his destination, and such baggage arrives at its destination, and is not, from any cause, delivered to such passenger, it is the duty of the company to deposit the baggage in its baggage room, in which event its responsibility becomes that of warehouseman, and it must respond in damages for any neglect in that capacity.⁸

Injuries to Passengers, Employees and Strangers.

In Virginia it is decided that a railroad or sleeping-car company is not liable for the death of a passenger at the hands of an intruder upon the cars for the purpose of robbery, in the absence of evidence to show that they or their employees knew of the danger impending, or of circumstances to arouse their suspicion.⁹

In New York there was evidence that plaintiff started to leave defendant's train, on which she was a passenger, at her destination, while the train was opposite the passenger depot platform, as soon as the train stopped; that she proceeded at once to the platform of the car from her seat, near the door; that the train started within a few seconds after its arrival; that plaintiff did not know the train had started till she reached the platform of the car, and had descended to the second of the three steps thereof, that she then sought to return; that she was encumbered with a bundle, and, in attempting to turn around, became dizzy, and fell backward from the car. The Supreme Court rules error to direct a verdict for defendant on the ground of contributory negligence.¹⁰

In California it is decided that a railroad is not liable for vindictive or punitive damages on account of a wanton or malicious act of a conductor or one of its trains toward a passenger in executing the authority given him, unless the malicious act was either authorized or ratified. It is at most only liable for the actual damages sustained.¹¹

In New York there was evidence that plaintiff, at the invitation of an employee of the defendant carrier, got upon its cars, which were so crowded as to necessitate his riding upon the platform; that, due to the crowd upon the platform, the carrier was unable to close the gates on the cars as required by statute; that the conduct of an employee of the carrier, in striking at a passenger, caused the crowd on the platform to jostle; and that plaintiff, in attempting to retain his position, involuntarily seized the railing behind him, whereby his arm was caught between the railings of the car on which he was riding and the one behind him and broken. The Court of Appeals rules that the evidence was not insufficient, as a matter of law, to show negligence on the part of the carrier.¹²

In Illinois the Supreme Court decides that a railroad which advertises an excursion over its road on a day named, by special train, to a certain city, and return, and does not in such advertisements limit its responsibility for the excursion from first to last, but treats the city as one of the stations of its road in the time table for the special train, and sells the excursion tickets over its own and a terminal association's line, to which the entire train, excepting the engine, is transferred, for the purpose of being drawn into and out of the city, is responsible for an accident resulting from an overcrowded condition of the cars, though such accident happened on the terminal association's line.¹³

In Michigan plaintiff, who was injured while coupling cars alleged that, owing to the negligence of defendant in furnishing an inferior quality of oil for lanterns used by employees, he was unable to see clearly, and was injured. It appeared that the defendant had investigated the question as to the quality of the oil used, and that plaintiff, moreover, had been using the oil for over two months without complaint. The Supreme Court holds that the evidence did not warrant a verdict finding defendant guilty of negligence.¹⁴

In Iowa it was held competent for the plaintiff to show that it was the custom generally on defendant's road to uncouple cars in motion, though contrary to the rules, and that the officers of the defendant company knew of the custom, and had made to objection to it.¹⁵

In Texas plaintiff, a section hand on a railroad, while placing new ties under the track, in reaching for a tie, stepped into the trench dug to receive it; and, while so standing, the foreman shoved the end of the tie against his foot, crushing it between the tie and the rail. The Supreme Court rules that neither plaintiff's assumption of the risks of the employment, nor his want of care in placing his foot in the trench, was a defense to the negligence of the foreman, who knew, or should have seen, the position of plaintiff.¹⁶

In Texas it is held that where a railroad employee engaged in repairing a car placed a flag thereon, as required by a rule of the company, and the same was removed without authority or without negligence on the part of the company, and such employee was injured by a collision with other cars driven against the car in which he was working, while the flag was not in position, the company was not liable.¹⁷

In Texas it is held that where a foreman of a yard orders a switchman to couple a moving car to other cars, and while he is doing so such moving car is struck by other cars, without warning to the switchman, the risk of having the cars jammed together while he is between them is not a risk incidental to the business assumed by him.¹⁸

In Mississippi the railroad company furnished a plow for removing earth from cars, operated by engines to which it was attached by cable. For operating around curves, cars were furnished with sheaves attached to their sides through which to pass the cable. The portion of the cable between the first car and the shovel, in working around a curve, became submerged in water. Plaintiff, who had charge, in order to gather up the slack, and without knowing that the cable was caught on a submerged stump, placed the cable around the stanchion of the car, instead of through the sheaves; and when the engine, at his signal, started ahead, the cable caught on the stump, tightened, and the side of the car over the stanchions of which the cable had been placed, by reason of the strain and rottenness of a sill of the car, gave way, and plaintiff's leg was broken. The Supreme Court holds that plaintiff, having used appliances in an improper manner, for a use for which they were not furnished, could not recover.¹⁹

¹ *Allam v. P. R. R.*, 5 Pa. Dist. R., 54.

² *Bowler v. T. & O. C.*, 10 Ohio Cir. Ct. R., 272.

³ *Beers v. B. & A.*, 34 Atl. 1 rep., 541.

⁴ *St. L. I. M. & S. v. Anderson*, 35 S. W. Rep., 791.

⁵ *T. & O. C. v. Ambach*, 10 Ohio Cir. Ct. R., 490.

⁶ *A. T. & S. F. v. Critenden*, 44 Pac. Rep., 1,000.

⁷ *K. C. R. R. S. & M. v. Patten*, 45 Pac. Rep., 108.

⁸ *Connell v. C. & O.*, 21 S. E. Rep., 467.

⁹ *Mahar v. N. Y. C. & H. R.*, 39 N. Y. S., 63.

¹⁰ *Warner v. S. P.*, 45 Pac. Rep., 187.

¹¹ *Graham v. Manhattan Ry.*, 43 N. E. Rep., 917.

¹² *C. & A. v. Dummer*, 42 N. E. Rep., 698.

¹³ *Huffman v. M. C.*, 67 N. W. Rep., 118.

¹⁴ *Spaulding v. C. St. P. & K. C.*, 67 N. W. Rep., 227.

¹⁵ *T. & P. v. Gale*, 35 S. W. Rep., 802.

¹⁶ *G. C. & S. F. v. Wittig*, 35 S. W. Rep., 857.

¹⁷ *M. K. & T. v. Crane*, 35 S. W. Rep., 797.

¹⁸ *Ill. Cent. v. Daniels*, 19 South. Rep., 830.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

- Boston, Revere Beach & Lynn*, 1 per cent., payable Jan. 1.
- Catawissa*, 3½ per cent. on preferred stock, payable Dec. 18.
- Cheraw & Darlington*, \$1.50, payable Dec. 10.
- Chicago, Rock Island & Pacific*, quarterly, ½ per cent., payable Feb. 1.
- New York, New Haven & Hartford*, quarterly, 2 per cent., payable Dec. 31.
- Northern Central*, 4 per cent., payable Jan.
- Petersburgh*, 3½ per cent. on common and preferred stock, payable Jan. 2.
- Richmond & Petersburg*, 3½ per cent., payable Jan. 2.
- Southwestern*, \$2.50, payable Jan. 5.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

- Allentown*, annual, Reading Terminal, Philadelphia, Jan. 11.
- Philadelphia, Wilmington & Baltimore*, annual, Wilmington, Del., Jan. 13.
- Pittsburgh & Lake Erie*, annual, Pittsburgh, Pa., Jan. 25.
- Rome, Watertown & Ogdensburg*, annual, Central Trust Co., New York, Dec. 28.
- St. Louis, Vandalia & Terre Haute*, annual, Greenville, Ill., Jan. 12.
- San Francisco & North Pacific*, annual, 222 Sansome street, San Francisco, Cal., Jan. 10.
- Terre Haute & Indianapolis*, annual, Terre Haute, Ind., Jan. 4.
- Western New York & Pennsylvania*, annual, 104 South Fifth street, Philadelphia, Pa., Jan. 11.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

- The *American Association of General Baggage Agents* will hold a convention at Richmond, Va., on Jan. 20, 1897.
- The *International Association of Car Accountants* will hold a convention at New Orleans, La., on Feb. 23, 1897.
- The *American Railway Association* will hold its convention at Richmond, Va., on April 7, 1897.
- The *National Convention of Railroad Commissioners* will be held at St. Louis, Mo., on May 11, 1897.
- The *International Association of Ticket Agents* will hold a convention at San Antonio, Tex., on March 10, 1897.
- The *Association of American Railway Accounting Officers* will hold a convention at Richmond, Va., on May 26, 1897.
- The *Association of Railway Claim Agents* will hold its convention at St. Louis, Mo., during the last week of May, 1897.

The *Master Car Builders' Association* will hold its annual convention at Old Point Comfort, Va., beginning June 8, 1897.

The *American Railway Master Mechanics' Association* will hold its annual convention at Old Point Comfort, Va., beginning June 15, 1897.

The *National Association of Local Freight Agents' Associations* will hold a convention at Washington, D. C., on June 8, 1897.

The *Association of Railway Telegraph Superintendents* will hold a convention at Niagara Falls, N. Y., on June 16, 1897.

The *National Association of Car Service Managers* will hold a convention at Boston, Mass., on June 16, 1897.

The *Train Despatchers' Association of America* will hold a convention at Detroit, Mich., on June 22, 1897.

The *Railway Signalling Club* will meet on the second Tuesday of the months of January, March, May, September and November, in Chicago.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p. m.

The *New York Railroad Club* meets at 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Tuesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2:30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets in its rooms on the first Wednesday of each month, at 8 p. m., to hear reports, and for the reading and discussion of papers. The headquarters of the Society are at 1736-1738 Monadnock Block, Chicago.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m., except during July and August.

The *Denver Society of Civil Engineers* meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7:30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 25 East Eighth street, Cincinnati, O., on the third Thursday in each month, at 7:30 p. m. Address P. O. Box 333.

The *Engineers and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m.

The *Western Foundrymen's Association* meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. S. T. Johnston, Monadnock Block, Chicago, is secretary.

The *Engineers' Club of Columbus, (O.)*, meets at 12½ North High street, on the first and third Saturdays from September to June.

The *Engineers and Architects' Association of Southern California* meets each third Wednesday of the month in the Hall of the Chamber of Commerce, Los Angeles, Cal.

The *Engineers' Society of Western New York* holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

The *Civil Engineers' Society of St. Paul* meets on the first Monday of each month, except June, July, August and September.

The *Engineers' Society of Western New York* meets on the first Monday of each month at the Society's rooms in the Buffalo Library.

The *Boston Society of Civil Engineers* meets at 715 Tremont Temple, Boston, on the third Wednesday in each month, at 7:30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets at 410 Penn avenue, Pittsburgh, Pa., on the third Tuesday in each month, at 7:30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds its formal meetings on the third Wednesday of each month from September to May, inclusive, at 710 Terry Building Roanoke, at 2 p. m.

International Association of Ticket Agents.

The Executive Committee of the International Association of Ticket Agents met in New York last week, and advanced plans for the seventh annual convention at San Antonio, Tex., March 10, and a trip to the City of Mexico.

Central Railroad Club.

The committee having charge of the seventh annual dinner of the club announce that it will be held at the Hotel Iroquois, Buffalo, on Friday evening, Jan. 8, at 7:30 o'clock. Tickets are two dollars, and may be obtained from Mr. Harry D. Vought, Secretary, 152 Elmwood avenue, Buffalo.

Central Association of Railway Officers.

The following officers of the Central Association of Railway Officers have been elected for the ensuing year: T. F. Whittlesey, who has held the presidency for three years, is succeeded by A. L. Mills, General Superintendent of the Toledo, St. Louis & Kansas City, was made President; W. H. Potter, Superintendent of the Penn-

sylvania Company, was elected Vice-President, and William Crogan, Superintendent of the Railway Mail Service, Secretary. New regulations and rules of order were adopted.

Northwestern Railway Club.

The Northwestern Railway Club held its regular monthly meeting Dec. 15 in the Ryan Hotel, St. Paul. The papers read were "Abuses of Air Hose Couplings," by F. B. Farmer, of the Westinghouse Air-Brake Co.; "Some Notes on Manipulation of Iron and Steel in Blacksmithing Work," by George F. Hinkins, foreman of blacksmithing St. Paul & Duluth road; "Traveling Engineers," by C. E. Slayton; "Substitution of Minerals for Lead in Coach Painting," by F. E. Mallory, and "A Few Observations in Connection with Locomotive Lubricators," by G. R. Parker.

Chicago Electrical Association.

The Chicago Electrical Association met in Room 1737, Monadnock Block, Chicago, Friday evening, Dec. 18. Mr. E. J. Jenness read a paper, "Decorative Lighting," which was discussed by Mr. E. F. Norton. Various current topics were discussed by Mr. T. G. Grier.

Officers were elected for the year 1897, as follows: S. G. McMeen, President; F. S. Hickok, Vice-President; E. J. Jenness, Treasurer; J. R. Cravath, Secretary. Directors, W. Clyde Jones, G. W. Knox and K. B. Miller.

At the next meeting, Jan. 15, Mr. D. W. C. Tanner, with Barton & Brown, patent attorneys, will present a paper, "Conventional Diagrams of Electrical Apparatus."

Engineers' Club of St. Louis.

The annual dinner was held Dec. 16, at the Southern Hotel St. Louis, there being 43 members and seven visitors present. The result of the election of officers for 1897 was announced as follows: President, Edward Flad; Vice-President, William H. Bryan; Secretary, Richard McCulloch; Treasurer, Thos. B. McMath; Librarian, Julius Baier; Directors, J. A. Ockerson and B. H. Colby; Members Board of Managers of the Association of Engineering Societies, J. B. Johnson and E. A. Hermann. President Ockerson addressed the club on the work that it had accomplished during the past year, calling special attention to the excellent condition of its membership list, and its finances. In closing he introduced the new President, Mr. Edward Flad, who spoke briefly, expressing his thanks for the honor conferred upon him. Mr. B. H. Colby responded to the toast, "The Municipal Engineer," explaining the difficulties which beset the pathway of the engineer in city service. Mr. E. J. Spencer spoke on the "Production and Distribution of Electricity." Prof. W. S. Chaplin spoke upon "The Engineer in the Orient," and Mr. R. E. McMath on "Civil Service in Municipal Affairs."

Twenty-fifth Anniversary of the Stevens Institute of Technology.

Feb. 18 and 19, 1897, have been set apart by those interested in the welfare of Stevens Institute, for the purpose of celebrating the twenty-fifth anniversary of that institution. The festivities will include a banquet at the Waldorf, New York, the first night, Thursday; a reception by Mrs. E. A. Stevens, at Castle Point, on the following afternoon, and on the evening of the same day a promenade concert at Hoboken.

The Literary Committee is preparing an illustrated souvenir publication, the principal feature of which will be a record of the work done by the graduates of the Institute. It will include valuable papers contributed to engineering societies, and it is especially intended to give an account of original investigations and prominent engineering enterprises with which the members of the alumni have been associated.

It is a noteworthy fact that every member of the original faculty is still alive, and all but one—Professor Thurston—is at present a professor in the Institute. Some time since, President Henry Morton prepared a record of the 551 members who graduated since the organization of the Institute and previous to 1895. As this may be of interest, we give below the classification:

Superintendents and managers of the entire business of important departments of machine shops and like engineering works.

Consulting engineers, carrying on professional work on their own account, 54.

Professors in technical or engineering colleges or schools, 30.

Assistant engineers or superintendents in workshops and like mechanical establishments, 55.

Presidents, vice-presidents, secretaries and treasurers of manufacturing companies, 16.

Employed in designing, drawing and superintending construction of machinery, 103.

Faithful lawyers and solicitors, agents and inspectors for manufacturing companies, 36.

Superintendents of motive power on important railroads, 8.

In employ of foreign corporations, 13. Editors of engineering journals, 6; architects, 3; chemists, 4. Unknown or not classified, 50. Deceased, 25. Among the unclassified should be mentioned the artist, Mr. Eugene L. Vail.

New York Railroad Club.

At the meeting of the club on Dec. 17 the discussion was on a paper by Mr. E. E. Russell Tratman, entitled, "The Relations of Track to Traffic on American and Foreign Railroads." The paper is a very exhaustive one and takes up 76 pages of the printed proceedings of the club, together with a number of inserted tables. The first of these gives in tabular form particulars of track construction, with general dimensions of freight and passenger locomotives, and amounts spent for maintenance of way for 20 roads. Other tables give the weights of rails in use in 1880 and 1896 on about 35 roads; weights and dimensions of locomotives and the weights of freight and passenger cars on about 40 lines, traffic statistics of a few roads, and standard spacing of ties on half a dozen lines. An appendix has general statistics of American railroads in the year 1894 which appear to have been condensed from the Interstate Commerce Commission reports and "Poor's Manual." Toward the end of his paper the author also gives information in regard to the track and equipment of foreign roads, similar to that given for American roads. Besides all this Mr. Tratman publishes a number of diagrams of track obtained by Mr. Dudley with his dynamograph car showing the irregularities of track with rails of 65, 80 and 100 lbs. The author also quotes from the detailed report of the physical conditions of the Lake Erie & Western, prepared by Mr. W. F. Goltra, C. E., Chief Clerk to the General Manager of the road. Mr. Tratman's statistics are not for the same roads in all of his tables. He states that he has not attempted to treat of conditions on those roads having a well maintained track laid with 50 and 100-lb. rails, confining his investigations to what might be termed average roads, and especially those which carry heavy traffic hauled by locomotives and cars of equal weight with those on the trunk lines over rails of 56 to 70 lbs. per yard, and with a track of varying stages of maintenance.

Mr. Tratman has not selected, however, any special

roads and confined the statistics in his various tables to such roads. If all the details of track structure and equipment which he has collected referred to any special group of roads, the information would have more significance. The difficulties in getting complete figures for any group on the points covered, however, are very great. And Mr. Tratman seems to have assembled such figures as he could obtain without much regard for their relations to each other.

For instance, in his table showing the particulars of track and the general dimensions of locomotives on American railroads he gives statistics covering 20 roads. In a tabular review of operating expenses showing the division of expenses between the maintenance of way, structures and equipment and transportation accounts he gives figures for but five roads, the Great Northern, the Wabash, the Norfolk & Western, the Rio Grande Western, and the Chicago, St. Paul, Minneapolis & Omaha. In a table giving some detailed particulars of the weights and measurements of locomotives he has named about 35 companies, but few of these, so far as we have noted, are roads which are included in his other tables. In a table of weights of freight and passenger cars he has particulars of box car dimensions from but six companies, for gondola cars from but eight companies, and from passenger cars from 11 companies, the roads including a number of the trunk lines, two or three of the important Western lines and then such roads as the North Pacific and the Duluth & Iron Range, and this is about all. This is not written to find fault with Mr. Tratman's paper, but simply to give a fair general idea of what it covers and how. It represents a great amount of patient and disinterested labor. Mr. Tratman has given a considerable amount of information which was not obtainable in convenient form, and which will have some use for investigators.

The discussion was rather general, but Mr. P. H. Dudley and Mr. George S. Strong made interesting contributions. Mr. Dudley gave a succinct review of the results of his investigations by means of his dynamograph car, and spoke of the progress which had been made in track, and particularly in the increase in the size of the rail section between 1881 and the present day. He exhibited a number of diagrams, giving other details than those contained in the diagrams which Mr. Tratman had included in his paper tending to show the increasing stability of the track by the use of the heavier and stiffer rails of 80 lbs. and upward instead of those of 56, 60 and 65.

Mr. Strong emphasized the care which should be taken to obtain a perfectly balanced locomotive or as near it as possible. He pointed out that railroad officers frequently forgot to take into consideration that a well-balanced heavy engine is less destructive to the track than one of several tons lesser weight with reciprocating parts out of proportion.

Mr. Walter G. Berg, of the Lehigh Valley, spoke of the use of creosoted ties. He did not agree with Mr. Tratman's unqualified approval of treated ties, and pointed out that preservatives could only be used with soft ties and that where these were laid in a track with a heavy traffic they very quickly wore out under the rails, so that their increase in life under these conditions was not any greater, and in fact was often much less, than the untreated hardwood ties. He considered that treated ties could be used most profitably on roads of light traffic and on branches and side tracks, but wherever they were used with any considerable traffic tie plates should be used on each tie. He took exception also to the remarks of Mr. Tratman in regard to the responsibility of engineers for the small progress which had been made in improvement of track as compared with the progress which had been made in locomotive and car construction. He thought that the circumstances under which railroads were first built in this country had placed in power in executive positions officers who were not likely to give due attention to maintenance questions. Engineers seldom had final authority in regard to questions of track, and he did not consider it fair to charge the engineer with the responsibility for a condition which he had no power to change.

President Mitchell appointed Mr. James H. Bailey, Mr. R. A. Parke and Mr. Geo. S. Strong as a committee to prepare resolutions on the death of Mr. David L. Barnes.

It was decided on recommendation of the Executive Committee to discontinue the present method of exchanging the printed proceedings of the club with the members of all other railroad clubs. Hereafter the club will buy in bulk the printed proceedings of other clubs and distribute them to the members of the New York Club with the proceedings of the club. The club will agree to sell its own proceedings at cost to any other railroad club in such quantities as may be desired.

PERSONAL.

—Mr. Charles K. Averill, for many years Treasurer of the Housatonic Railroad, died at his home last week, aged 84 years.

—Mr. Charles P. Clark, President of the New York, New Haven & Hartford road, has been elected President of the Fall River Line, vice J. R. Kendrick, recently deceased.

—Mr. Edward F. Knibloe, General Agent for the lessees of the Buffalo Creek Railroad, has been elected President of the Buffalo Association of Railroad Superintendents.

—Mr. George C. Hubbell, General Purchasing Agent of the Long Island road, will retire from that office on Jan. 1 and it is said will assume a superintendency on another line.

—Mr. W. G. Bayley has been promoted from the Superintendency of the Cairo Division of the Cleveland, Cincinnati, Chicago & St. Louis, to the St. Louis Division of the same system.

—The Pittsburgh Bridge Company has elected Mr. Thomas M. Nelson President, to succeed Mr. John H. Sawyer, who has resigned to assume the office of Treasurer, made vacant by the resignation of Mr. Hugh Ferguson.

—Mr. E. S. Horn retired from the Superintendency of the Lake Superior Terminal & Transfer on Dec. 9. His successor is J. D. Finn, formerly Superintendent of the Montana Division of the Northern Pacific. Mr. Horn will go into business in Georgia.

—Mr. B. F. Johnston, who has been General Manager of the Chicago, Paducah & Memphis road, will retain charge, as formerly, of that road, becoming Division Superintendent of the Chicago & Eastern Illinois, to which it has now been turned over for operation.

—Mr. W. C. Dotterer, for several years Manager of the Union Compress of Little Rock, Ark., has resigned to accept the position of General Manager of the New Orleans & Western, including the terminals at Port

Chalmette. He will take charge of his new work on Jan. 1.

—Mr. J. C. Murphy, Deputy Railroad Commissioner, of Wisconsin, will retire from that position at the close of his present term of office, and will be succeeded by C. A. Coon, at present executive clerk in the office of Governor Upham. Mr. Coon's appointment is to take effect on the first of the year.

—Mr. John M. Turner has resigned the office of General Manager of the New Orleans & Western, to which he was appointed in June last. Mr. Turner was formerly Division Superintendent of the Illinois Central at New Orleans, and more recently has been Superintendent on the South Carolina road.

—Mr. W. S. Sherwood, dining car conductor on the Northern Pacific, has traveled from St. Paul to Tacoma and back over 500 times, having been on that road since it was opened through in 1883. For 10 years before that Mr. Sherwood worked for the Pullman Company, and has traveled altogether 3,212,000 miles.

—Mr. J. M. Graham, Superintendent of the Ohio division of the Baltimore & Ohio, has been appointed General Superintendent of the Trans-Ohio Division, with headquarters at Chicago, vice Mr. J. Van Smith, transferred to New York. Mr. J. H. Glover, Trainmaster of the Ohio division, will succeed Mr. Graham as Superintendent.

—Mr. D. Atwood, for the past 10 years General Freight Agent of the Chicago, Rock Island & Pacific lines west of the Missouri River, will on Jan. 1 transfer his office to Chicago to take up special duties. Mr. E. B. Boyd, at present First Assistant General Freight Agent, will succeed Mr. Atwood as General Freight Agent of the lines west of the river at Topeka.

—Mr. Gerritt Fort, Chief Clerk in the General Passenger Department of the New York Central & Hudson River road, will, Jan. 1, become Secretary of the Central Traffic Association, with headquarters in Chicago. Charles E. Storey, of the New York Central's advertising bureau, will succeed Mr. Fort, and J. E. Root will succeed Mr. Storey.

—Mr. Morgan Jones, who has been Receiver of the Fort Worth & Denver City road, has been appointed a Vice-President and General Manager of the road, which is now being operated by its own stockholders. Mr. Jones was one of the projectors of the road and the executive officer during its construction, and has since then retained his connection with the line.

—Mr. George W. Inge has been appointed General Superintendent of the Sedalia, Warsaw & Southwestern, to operate that road for the Missouri Pacific, which has recently again assumed control of its operation. For about two years past the line has been managed independently by its own stockholders. They have recently returned the property to the Missouri Pacific for operation.

—Mr. H. A. Williams, of Savannah, Ga., has been appointed Train Master of the Southern at Durham, N. C., to succeed Mr. E. L. Ewing, who was recently transferred to Asheville. Mr. Williams began his railroad career on the Richmond & Danville 25 years ago, as a flagman. With the exception of two years, that he was on the Florida Central & Peninsular he has been in the service of the Southern.

—Mr. Clinton G. Hancock, General Passenger Agent of the Philadelphia & Reading, died at his home in Philadelphia on Sunday last of rheumatic gout. Mr. Hancock was born in Philadelphia in 1845, being a son of Samuel Hancock, formerly City Controller. In 1864 he entered the employ of the Reading as a clerk. In 1869 President Gowen appointed him General Ticket Agent. In 1879 he became General Passenger Agent, and he had since held that position.

—Mr. Burton Johnson, Assistant General Freight Agent of the Chicago & Northwestern Railroad, will become General Freight Agent of the Wisconsin Central lines Jan. 4, to succeed Mr. J. C. Mackinnon, resigned. Mr. Johnson is about 38 years of age. He was for years Assistant General Freight Agent of the Northwestern, in charge of the freight business on the Northern system in Wisconsin and Michigan. Subsequently he had charge of the Iowa lines of the road.

—Mr. W. E. Bushnell, who has been with Fairbanks, Morse & Co., Chicago, for 15 years past, managing its railroad department, has accepted a position as Manager of the Kalamazoo Railroad Velocipede & Car Co. and will assume his new duties about Jan. 1. The appointment is made to relieve Mr. H. G. Haines, Secretary and General Manager, who will retain those offices with the Kalamazoo Company, of some of his present duties in order to enable him to spend more time traveling.

—Mr. Henry D. Welsh, a director of the Pennsylvania Railroad Company, died last Sunday at his home, Wissahickon Heights, near Philadelphia, after a protracted illness. He was 72 years old, and had been prominent in the commercial affairs of Philadelphia for nearly 50 years. Mr. Welsh was an organizer and one of the first Directors of the American Steamship Co., being elected President of the Company in 1874. In 1878 he became a director of the Pennsylvania Railroad Company, and at the time of his death was a director of over 30 of its subsidiary lines.

—Mr. E. R. Reynolds, General Manager of the Long Island Railroad, has resigned that office to accept service elsewhere. Mr. Reynolds has been General Manager of the Long Island Railroad since 1892. Previously he had been President Corbin's assistant, and altogether he has been in the employ of the Long Island company nearly 18 years, beginning as a clerk. The office of General Manager, which was created for him by President Corbin, will be abolished on his retirement, and the duties of the position assumed by President W. H. Baldwin, Jr.

—Mr. Harry I. Miller, General Superintendent of the St. Louis, Vandalia & Terre Haute, has resigned, that office having been abolished by Receiver Malott. The Receiver has abolished this and other offices and reduced the salary of officers and clerks on the ground of economy. Mr. Miller is an old Pennsylvania officer, and was a division superintendent for many years before going to the Vandalia road. His first position on this line was as Superintendent of the St. Louis Division, and soon after Mr. Turner's appointment as General Manager he became General Superintendent of the road.

—Mr. F. Rogers, Chief Clerk of the General Freight Department of the Eastern Railway of Minnesota, has been appointed General Freight and Passenger Agent of the Washington & Columbia River, at Walla Walla, Washington; appointment effective Jan. 1. Before going to the Great Northern, Mr. Rogers was Assistant General Freight Agent of the Chicago, Burlington & Quincy, at Chicago. He began railroad business as a yard clerk of the Missouri, Kansas & Texas at Hannibal,

Mo., and has since been prominently identified with the freight departments of the Burlington and Great Northern lines.

—Mr. C. F. Resseguie, now Superintendent of the Chicago Division of the Atchison, Topeka & Santa Fe, has been appointed General Superintendent of the Gulf, Colorado & Santa Fe road. Mr. W. C. Nixon, now Commercial Agent of the company in Chicago, and only a short time ago Superintendent of the Chicago terminals, has been appointed Superintendent of the Chicago Division, to succeed Mr. Resseguie. The latter was for a long time with the Chicago & Northwestern, then Superintendent Illinois lines of the Chicago, Burlington & Quincy for two years, to 1887. Then he went to the Union Pacific with T. J. Potter, and was afterward with the Oregon Navigation & Railway Company. He has been with the Atchison company since 1893.

—Mr. J. Van Smith, General Superintendent of the Trans-Ohio Division of the Baltimore & Ohio, has been appointed General Superintendent of the New York division, succeeding Mr. Frank S. Gannon, who resigned to become General Manager of the Southern Railway. Mr. Smith will take charge of his new office Jan. 1, and will also be General Superintendent of the New York Division of the Baltimore & Ohio. He is a son of William Prescott Smith, who was Superintendent of Transportation of the Baltimore & Ohio during the war and entered the service in 1871 as a freight clerk with the Northern Central. Two years later he entered the employ of the Baltimore & Ohio as a clerk in the car record office. In 1882 he became General Baggage Agent. Five years later he was made Assistant Superintendent and General Agent at Baltimore. Shortly after Mr. Smith was appointed Superintendent of the Philadelphia Division. In 1894 he was made Superintendent of the Trans Ohio Division, which position he vacates to take his new office.

—Mr. Moncure Robinson, a Director of the Seaboard Air Line, died on Dec. 12 on a steamer bound for Colon when it was two days out from New York. Mr. Robinson was the son of the late Moncure Robinson, one of the projectors of the Philadelphia & Reading, who was prominently identified throughout a long life with the construction and management of important Southern roads. The son was associated with his father in the management of his interests in Southern lines early in life, and for some years past had been a Director in many of these companies, including the Baltimore Steam Packet Co., the Seaboard & Roanoke and the Richmond, Fredericksburg & Potomac. He was a member of the recent Seaboard Pooling Committee of three which conducted the negotiations with Mr. Thomas F. Ryan for the purchase of the Seaboard & Roanoke property. Soon after the final notification to Mr. Ryan that the negotiations would not be completed Mr. Robinson left this country to take a sea trip for recreation.

—The resignation of Mr. John Hickey as Superintendent of Motive Power of the Northern Pacific was briefly referred to in this column last week. At that time we had not learned any particulars of the resignation, news of which reached us a short time before that issue went to press. Mr. Hickey's health has long been overtaxed by his duties, and recent domestic afflictions, the latest the death of his youngest child a month ago, the third child whom he has lost in the last two years, made complete rest from business affairs absolutely necessary. His retirement has brought out many expressions of esteem for him by the men of his department, and the officers, have also spoken in high terms of his management of his department. His just treatment of his subordinates is especially dwelt upon, and he seems to have won their sincere loyalty to a remarkable degree. Mr. Hickey has long been prominent in the Master Mechanics' Association, of which he was President in 1894, and has also frequently taken part in the discussions in the Western and other railroad clubs. His friends in these associations will wish for him a speedy and complete restoration of health.

—Mr. Andros B. Stone, the old and well-known bridge builder, died in New York City last week. He was a member of a firm which built a great number of bridges throughout the United States, being especially identified with the Howe truss construction. The brother of Mr. Stone had married a sister of William Howe, the originator of this bridge, and her three brothers soon after formed a partnership for bridge building, which was eminently successful. The bridge building establishment, now operated by the R. F. Hawkins Co., of Springfield, Mass., was started by the firm, as well as plants in other parts of the country. Mr. Stone's chief work was with the firm of Stone & Boomer, which built the first bridge across the Mississippi River, and a structure across the Illinois River having the largest draw at that time known. He was later engaged in the manufacture of iron at Cleveland (1858) and became President of the Cleveland Rolling Mill Co., the Union Rolling Co., of Chicago, and other iron and steel concerns. He was one of the first to use the Bessemer process in this country, introducing it in his rolling mills at Cleveland after a visit to Europe to investigate the process. He had also been identified with the St. Louis, Keokuk & Northwestern railroad and the Poughkeepsie Bridge Co. He has lived in New York since 1871 and has been prominent in various enterprises. He was a director of the Henning Rapid Transit Co., and President of the A. B. Stone Construction Co., a concern formed a year or two ago. Mr. Stone was a very generous man, and was actively identified with philanthropic institutions in New York, particularly the Children's Aid Society, to which he gave a summer home on Long Island, and Grace Church.

—Mr. Frank M. Baker, of Addison, General Superintendent of the Addison & Pennsylvania Railroad, has been appointed a State Railroad Commissioner of New York by Governor Morton. He succeeds Mr. Michael Rickard, who died suddenly a week ago. One member of the New York Railroad Commission must be a practical railroad man, and Mr. Baker will thoroughly fill this requirement. He has been in railroad work for nearly thirty years, and has been General Superintendent of the Addison & Pennsylvania since 1883. As the line is but 42 miles long, and has but a moderate traffic, he has been in direct charge of all its departments, acting as the General Freight and Passenger Agent and Auditor, as well as General Superintendent. A year or two ago he went to Georgia and had charge of the construction of about twenty miles of new road in that state, but returned to New York as soon as the line was finished. He was one of the New York State Commissioners at the Atlanta Exposition, and has been in other ways identified with State affairs. His appointment as Railroad Commissioner was a complete surprise. It is stated that he was recommended by the presidents of the Delaware & Hudson, the Delaware, Lackawanna & Western, the Erie and many other officers of various railroads in New York state; and, the newspapers say, Mr. Thomas C. Platt, who is President of the road which Mr. Baker has managed. In view of

Mr. Platt's position in New York state politics the gossip thinks that his recommendation was at least as good as that of any other of Mr. Baker's sponsors. Irrespective of the politics which may be in the appointment it adds to the board a member who has had an experience in railroad affairs which it has lacked. Mr. Baker is a man of energetic qualities and has a promising opportunity to do excellent service for the state of New York.

ELECTIONS AND APPOINTMENTS.

Baltimore & Ohio.—The directors of the railroad have unanimously re-elected John K. Cowen as President, and chosen C. W. Woodford as Secretary to succeed Andrew Anderson, who retires on account of continued ill-health.

Fort Worth & Denver City.—At a meeting of the directors held at the offices in Fort Worth, Tex., on Dec. 11, K. M. Van Zandt resigned as a director, and Morgan Jones was elected in his stead. Then followed the election of officers: G. M. Dodge, of New York, President; Morgan Jones, Vice-President; K. M. Van Zandt, Treasurer, and George Strong, Secretary, all of Fort Worth. Morgan Jones is General Manager and J. V. Goode General Superintendent.

Georgia & Alabama.—At the annual meeting at Americus, Ga., J. Skelton Williams, of Richmond, Va., was re-elected President, and Cecil Gabbett, of Americus, Ga., Vice-President and General Manager.

Hoboken Railroad, Warehouse & Steamship Connecting Co.—At a meeting of the stockholders, in Jersey City, on Dec. 10, the following Board of Directors was elected: Col. E. A. Stevens, Richard Stevens, Robert L. Stevens, C. Albert Stevens, Palmer Campbell, E. A. S. Lewis, Charles Chapin and William A. Macy. The election of officers was postponed until another meeting. Palmer Campbell was appointed General Manager of the freight electric road.

New Orleans & Western.—John M. Turner has resigned as general Manager of the road, and Arthur T. Hill the position of Treasurer. W. C. Dotterer, of Little Rock, Ark., has been named as Mr. Turner's successor, and G. McD. Nathan elected as the successor of Mr. Hill.

New York, New Haven & Hartford.—All matters heretofore under the jurisdiction of the late James R. Kendrick, Third Vice-President, will be referred to the President's office at Park Square Station, Boston. C. M. Ingersoll, Jr., has been appointed Assistant to the President, with office at Park Square Station, Boston.

Pittsburgh, Connellsville & Wheeling.—At a meeting of the stockholders of this new road, at the St. Charles Hotel, Pittsburgh, Dec. 23, Alex. P. Funk, of West Newton, Pa., was elected President. T. J. Wisecarver, of Waynesburg, and G. H. Mordock, of Jefferson, were elected directors.

St. Louis & San Francisco.—A. J. Davidson has been appointed Superintendent of Transportation, with office at St. Louis, Mo., vice J. R. Wentworth, resigned.

Santa Fe, Prescott & Phoenix.—At a meeting of the Board of Directors of the company in Chicago Dec. 19 the following were elected officers for the ensuing year: F. M. Murphy, President and General Manager; D. M. Gerry, Vice-President; C. C. Bowen, Secretary-Treasurer and Auditor; G. W. Kretzinger, General Counsel, and W. A. Drake, Chief Engineer.

Susquehanna Connecting.—The incorporators of this company are: W. J. Lewis, Scranton, Pa.; Chas. Dupont Breck, C. Comegys, C. G. Boland, W. J. Lewis, of Scranton; A. L. Hopkins and F. P. Mohler, New York City, and J. L. Rusling, Paterson, N. J.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Baltimore & Ohio.—The heavy curves between Tabb's Station and Myers Hole, a few miles west of Harper's Ferry, W. Va., will shortly be eliminated, an appropriation for the work having been recently made. The present grade is 0.8 per cent., and the maximum curvature 5 deg., with a number of reversions. A new line has been run with a grade of 10 ft. per mile and a maximum curvature of 3 deg., with long tangents. The contractors have already begun the work, but it will take several months yet to complete it. In grading about 120,000 cu. yds. of material will be removed. The material to be removed consists of clay and limestone rock in pockets and small ridges.

Belington & Roaring Creek.—This railroad, extending from Belington to a connection with the West Virginia Central & Pittsburgh, opened for traffic on Friday last. Chief Engineer C. A. Cunningham, of Philadelphia, and a party of guests made the first trip over the road Saturday. The road was built to develop timber and coal lands.

Big Mountain.—This road is projected from Cedar Grove, W. Va., up Kelley Creek and the Kanawha River, to a connection with the Chesapeake & Ohio. The company was incorporated on Dec. 14, by G. S. Couch, C. B. Couch, R. T. Carmichael and S. L. Flourinoy, all of Charleston, W. Va.

Buffalo & Susquehanna.—General Manager Good-year states that the recent report that this line will be extended from Ansonia, Pa., to Wellsboro is incorrect.

Cambria County.—The work of grading this new road is about completed and will be ready for traffic in a few weeks. The only work of any consequence yet to be completed is in the vicinity of Carrolltown, Pa., and after this is done the line between Patton and Spangler will be ready for the coal traffic. The road is an extension of the Beech Creek.

Central Railway & Steamship Co.—The project for building a new line through Florida, from Palatka, to an unnamed objective point on the Gulf Coast, has been organized under this name at Orlando, Fla. The names of those interested have not been published.

Chesapeake & Ohio.—This company is making rapid progress on the extension of its Big Sandy Division between White House and Ward City, Ky., 15 miles. The new road passes through several towns and will develop coal and timber lands, which have heretofore depended upon the Big Sandy River for all transportation. The road will be opened early in the spring.

Chicago & Northwestern.—The second track just completed between Madison and Baraboo, Wis., will probably be continued from Baraboo to Elroy, 38 miles. It is proposed to change the alignment west of Baraboo, and a tunnel through a granite bluff at Ableman will do away with a sharp curve at that place.

Chicago Great Western.—General Superintendent

Shieda announces that service on the new extension from Eden to Mantorville, Ia., has been commenced, and regular freight and passenger business are now running.

Columbia & Western.—Parson, Winters & Boomer, of Butte, Mont., are the names of the contractors who are to do the grading on the extension of 20 miles of this road from Trail to opposite Robson, B. C. The line is projected by F. A. Halne, and is to furnish better facilities for the mining regions in Southern British Columbia. The construction work will be continued during the winter on such work as may be practicable, and it is hoped to have the line ready for operation early next season.

Deming, Sierra Madre & Pacific.—Track is now laid for 10 km. (6.2 miles) out of Juarez, Mex., on the Rio Grande River, and as soon as the overhead crossing of the Mexican Central has been built, the track-laying will go on toward Corralitos at the rate of a mile a day. The grading is completed for nearly 50 miles and the contractors are busy pushing on as fast as possible. Chief Engineer Fawson Smith expects that trains will be running through to Corralitos by next June.

Glenwood.—The Corporations Committee of Pittsburgh Councils has recommended an ordinance granting the Glenwood Railroad Co. the right to build a road along the Monongahela River bank, from the old Connellsville Railroad at a point 200 ft. east of Second avenue at Glenwood Station to a point 1,250 ft. west of Marion Station, on the same railroad. The object is to do away with the constant switching at Hazelwood avenue, where it crosses Second avenue. The proposed line is all on the company's own property. The line is to be built by the Baltimore & Ohio.

Gulf, Colorado & Santa Fe.—General Manager L. J. Polk let a contract on Dec. 10, to Z. J. Simmons, of Kenosha, Wis., to place new rock ballast on the entire road operated covering the lines from Galveston to Purcell, I. T.; Cleburne to Paris, Tex., and Temple to Ballinger, Tex.

Louisville, New Albany & Chicago.—Chief Engineer Hall and his assistants are preparing plans and specifications for cutting down the grades and straightening the curves on the Indianapolis Division. Some \$250,000 will be spent in such work during the coming year.

Manitoba & Lake Dauphin.—This road, which is now completed for 100 miles north from Gladstone, Manitoba, has secured running powers for 50 years from the Manitoba & Northwestern, between Gladstone and Portage La Prairie. It will thus operate from Portage La Prairie to the end of the road near Lake Dauphin, 130 miles. T. H. White, of Gladstone, is the Chief Engineer.

Mexican Roads.—A concession has been granted for building a road from Rinconada to Misantla, state of Vera Cruz. Rinconada is a small town on the Inter-oceanic Railroad, between Jalapa and Vera Cruz. Misantla is the leading town in the canton of the same name, a district possessing exceptional facilities for the cultivation of tropical fruits. The country through which the line is projected is well watered, and has extensive agricultural and forestry resources.

Mexican Southeastern.—The Mexican Congress has finally passed the concession obtained by W. T. Pritchard, for this company, which is now authorized to build from San Geronimo on the Tehuantepec National Railway to the frontier of Guatemala, where it will join the Guatemala Northern. The line is 420 km. long, and the branch from Tenela over the Sierra Madres to Tuxtla Gutierrez is 200 km. The road will be standard gage, and carries a subsidy of \$8,000 per kilometer. The company has deposited \$50,000.

Monongahela Connecting.—The extension of this road, which connects with the Pennsylvania and goes through the plants of the W. Dewees Wood Co., is to be undertaken next spring. Horace Crosby, Assistant General Manager of the National Tube Works Co., is the President of the road. It will pass from the Tube Works along the river bank up the Monongahela and the Youghiogheny to the new galvanizing works at Versailles. This five-mile extension will connect all the Tube Works plants and allow the company to transport freight directly from one mill to the other.

Munising.—Sixteen miles of this road from Munising, Mich., has been under construction during the summer, 6½ miles of this being a branch. Munising is a new town on Munising Bay, one of the Lake Superior harbors near the pictured rocks twelve miles additional of road is to be built to connect with the Chicago & Northwestern, between Escanaba and Ishpeming. This connection will be made early next year. There is only one bridge of any consequence on the road, a wooden trestle 600 ft. long and 35 ft. high, with a 56-ft. span. The road runs about on the divide between Lake Michigan and Lake Superior waters. The maximum grade is 1½ per cent. west and 1 per cent. east. The maximum curves are 6 deg. The road thus far has been built by the stock subscriptions and earnings of the short section in operation. There is now 25 miles of main line, 20 miles of which has been laid since Jan. 1, and 8 miles of branches, 6 miles of which has been laid this year. The company was organized to develop a tract of 180,000 acres of elm, pine and hardwood timber. The officers are: Dan P. Ellis, President; Fayette Brown, Vice-President; Howard Ellis, Treasurer; D. B. Chambers, Secretary; all of Cleveland, O. E. H. Scott, General Manager, La Porte, Ind., and R. C. Young, Munising, Mich., Chief Engineer.

New Roads.—Bids were opened on Dec. 10, for building a wharf and wharf railway on the north end of Tybee Island, Savannah, at the mouth of the Savannah River, for the purpose of landing the concrete, stone and other materials to be used by Venable Bros. in building the emplacements for the 8-in. guns. Mr. P. Sandford Ross being the lowest bidder, Captain Carter will recommend to the War Department that the contract be awarded to him. The work will have to be begun as soon as the Department accepts the bid, which will be forwarded to Washington at once.

The movement looking to the construction of a road from Morehead, Rowan County, N. C., to the canal coal fields in Morgan County, near Walnut Grove, controlled by the American Coal Company, of New York City, is being revived, and another election will be asked in Rowan and Morgan counties, to secure aid for the project.

Abram S. Hewitt, of New York, and others, who recently purchased 25,000 acres of coal and timber land in Fayette County, W. Va., have announced that they will commence work soon on an extension of a standard-gage road, now built part way into the property. The road will connect with the Chesapeake & Ohio, and is to be built to develop the coal and timber resources of the land recently purchased.

North Carolina Lumber Co.—Mr. J. F. Wrenn, of Richmond, has secured the contract to build seven miles of road for the North Carolina Lumber Company, at Tillery, N. C. The road will be a standard gage.

North Shore.—The preliminary injunction issued by the Beaver County Court, in Pennsylvania, in September, restraining the Pennsylvania lines from interfering with the construction of the new road at Rochester has been dissolved by Judge J. Sharpe Wilson. The decision is considered a virtual victory for the North Shore road, and it is expected, work on its construction will be arranged for at once. The road was surveyed some time ago by engineers under Col. J. W. Patterson, Chief Engineer, of Pittsburgh. The road will be built from Beaver Falls to Rochester and up the Ohio River to Conway. It will here strike north to the Pittsburgh & Western, and will be about 18 miles long, costing about \$500,000. Most of this money is said to have already been subscribed.

Nova Scotia Southern.—The grading and masonry has been pushed forward rapidly up to last week and only about 30 days' good dry weather is required to complete the grading from Shelburne to Jordan. The wet condition of the ground, however, has compelled the contractors to suspend grading for the present. The work to be carried on during the winter will soon be decided upon and the sub-contracts let. President Hervey and Mr. Murray, Manager of the Nova Scotia Construction Co., are to arrive in New York shortly, to report to the directors. The road is being built from Shelburne Harbor, via Jordan Falls, Indian Gardens, Cameron's Lake, Caledonia Corners, South Brookfield, North Brookfield Gold Mines, Pleasant River and Herford to New Germany (junction with Central Railway, 15 miles north of Bridgewater), also branch from Indian Gardens to Milton and Liverpool. The former line is 76½ miles and the latter 19½, total 96 miles. The line is located and all under contract to the Nova Scotia Construction Co., New Brunswick, N. J., Charles R. Strong, President; Thos. Murray, Manager. The whole line is under contract to be completed Nov. 1, 1897. The work is comparatively light; maximum grade, 1½ per cent., maximum curve, 6 deg. There will be six steel bridges, 125 ft.; one of 100 ft., three of 80 ft., and six of 50 ft.

Pittsburgh & Lake Erie.—A party of surveyors have recently staked out a route for a branch of this road to extend the full length of Neville Island, near Pittsburgh. Overtures were made to the road for a branch some time ago by several property owners, and it was decided to offer a free right of way. The plans involved building two bridges across the back channel. The island is seven miles long and nearly all above the danger of flood. The proposed railroad is to skirt the high ground, leaving room for manufacturing sites.

Portland & Rumford Falls.—It is expected that the Canton branch of this road will be completed through to Chisholm's mills, Maine, by next March. This is to be the terminus of the road, and is on the Maine Central Railroad, four miles from Peterson's Rips, and will be called Riley's.

Quincy, Omaha & Kansas City.—M. S. Cartter & Co., of St. Louis, were awarded the contract for grading and bridging the 34-mile extension from Trenton to Pattonsburg, Mo., referred to last week and previously. Work will be started at once and completed at the earliest possible date.

Salmon Creek Extension.—This road is proposed from Salmon Creek, Medocino County, Cal., to a point seven miles north. A company was incorporated on Dec. 3 with a capital stock of \$100,000, beginning with \$10,000. Incorporators: W. H. White, Elk; J. H. Tate, San Francisco; James Townsend, N. W. Hall and J. M. Robinson, Oakland, Cal.

Seattle & International.—At the first meeting of the Board of Directors under the new organization, held in New York recently, plans and estimates for improving the road were submitted and appropriations were made accordingly. The improvements will be made gradually and will include filling in, where necessary, where trestlework is now used, and in renewing and improving other trestlework, the substitution of iron for wooden bridges and the building of culverts.

Silver Springs & Western.—This road, building from Ocala to Silver Springs, Fla., is rapidly nearing completion. Rails have been laid to within a mile and a half of Silver Springs, and the rolling stock has been purchased. The company expects to have its line in operation by Jan. 1.

Susquehanna Connecting Co.—This company has been organized to build a road from a point on the Wilkes-Barre & Eastern at or near Paddy's Land, about 11 miles east of Wilkes-Barre, through the counties of Luzerne and Lackawanna to a point on the Priceville & Winton Railroad, in the borough of Winton, Lackawanna County. The line will be about 22 miles long. The capital stock is \$500,000. W. J. Lewis, Scranton, Pa., is the President, and the other directors are officers of the New York, Susquehanna & Western.

Texarkana & Fort Smith.—The company has completed track-laying to the Sabine River from the north, and will now commence work on the bridge to connect with the section in Texas already built.

Toronto, Hamilton & Buffalo.—The connection with the Grand Trunk main line at Hamilton, Ont., has been completed and the first train was run over the Desjardins Canal bridge and to the tracks of the older road Dec. 16. The completion of the spur connecting the main lines of the two roads is in accordance with the agreement entered into between the Canadian Pacific, as lessees of the road, and the Grand Trunk.

Walterboro & Western.—This road has now been completed for a distance of 26 miles from its initial point at Walterboro, S. C., where it connects with the Charleston & Savannah, its present terminal point being at the new town of Erhardt, in Colleton County. The new portion of the line is a continuation of the road which has been building for several years past, chiefly for lumbering operations, from a connection with a branch of the Charleston & Savannah, formerly the Green Pond, Walterboro & Branchville road. The road was formally reorganized under the general railroad laws in April, 1895, to do general freight and passenger business, although its chief traffic consists, as formerly, in carrying lumber. The officers of the company are J. H. Stokes, President; E. H. Finchen, Superintendent, and John F. Lucas, Treasurer.

Electric Railroad Construction.

Asbury Park, N. J.—It is proposed to build a new electric line from Asbury Park to Eatontown, and from Eatontown to Freehold, by way of Tinton Falls. The promoters of the road have surveyed the route, and as

soon as the right of way is secured and the necessary franchises obtained the road will probably be built. The route from Eatontown to Asbury Park is to be several miles shorter than by the present electric line.

Baltimore, Md.—Press reports state that the Central Railway Co., of Baltimore, has a force of engineers at work on the Belair road, preparatory to building a double-track electric line to Raspsburg and a single track road to Belair, Hartford County.

Bangor, Me.—We have been informed that active progress is being made on the preliminary arrangements for the new electric railroad, 28 miles in length, to connect Norway with Stoneham, Waterford, Albany and Harrison, in Maine. The road is designed to be used for both freight and passenger service.

Connellsville, Pa.—Regular service was established on the new Connellsville Suburban Street Railway Dec. 18, referred to among our notes Oct. 30. This line reaches the industrial plants on the outskirts of Connellsville.

Dallas, Pa.—The new electric line was opened Monday of this week. It will be operated by power from the Wyoming Valley Traction Co. The road will be extended to Harvey's Lake in the early spring.

Doylestown, Pa.—The electric road between Doylestown and Willow Grove will probably be commenced in the spring. All preliminaries for the work have been arranged. The officers of the road expect to have cars running by June 1, 1897.

East Liverpool, O.—Pittsburg capitalists are talking of building an electric road from the East End to Smith's ferry, with the ultimate intention of extending the line up the Ohio River to connect with the Beaver Valley Traction line, and then extend another line to connect with the line at Sewickley.

Fort Wayne, Ind.—Press reports state that Chicago contractors were awarded the \$275,000 contract for the construction of 28 miles of electric road from Fort Wayne, Ind., to Wawasee Lake, Ind. Construction work will begin at once and the road is to be completed by May next.

Greensburg, Pa.—The Jeannette, Greensburg & Pittsburgh Traction Co. has secured the right of way across the Westmoreland Coal Company's land, between Manor and Irwin. The road is now being built and it is expected that it will be completed by April next. This will give a through route from Greensburg to Irwin, a distance of 11 miles.

Hamilton, Ont.—The Barton Township Council has extended a free right of way to the Hamilton, Chedoke & Ancaster road for 20 years over the public highways on that portion of the township through which the company desires to run its lines, at the expiration of which time the company is to pay \$100 per mile per year.

Hartford, Conn.—Messrs. M. F. Tyler, T. H. Russell, D. N. Clark and others will apply to the General Assembly at its next meeting in January, for the incorporation of a railroad company to be operated by electricity or mechanical means other than steam, to run from the village of Westville to Woodbridge, Seymour, Bethany Center and Naugatuck.

Hull, Que.—At a meeting of the Hull Electric Co., on Dec. 16, it was decided to extend the road to Gatineau Point at once. All the material has been ordered, and the work will be proceeded with as soon as the arrangements for right of way are completed. The company are pushing the double-track line between Hull and Aylmer.

Irwin, Pa.—Work was begun on Dec. 12 of grading the road between Manor and Irwin, which will be completed in a short time.

Joliet, Ill.—At a special meeting held Dec. 12, the Board of Commissioners of the Illinois & Michigan Canal granted a franchise to Warren C. Riale and Vincent J. Duncan, of Ottawa, to build an electric road along the towpath between Joliet and La Salle, a distance of 62 miles. It is stated that under the terms of the grant a company capitalized at \$1,000,000 will be formed within a few days, and that it will pay to the State during the first six years of the life of the grant \$15 for each mile of track to be laid, for the second period of six years \$20 a mile, and for the last eight years of the grant \$25 a mile.

Lachine, Que.—Within 30 days the Park & Island Railway expect to have the power-houses at Lachine and St. Laurent in operation. The tracks on the lines to Cartierville is also completed, and the overhead work is now being constructed.

Marine City, Mich.—A franchise has been granted to John B. Dyar and F. S. Parker, for an electric railroad from Marine City to Mount Clemens, Mich., and a branch running to Algonac, making in all a line nearly a mile in length. The company has agreed to file a bond of \$2,000 to have the road completed by Sept. 1, 1897.

Montreal, Que.—The electric road from Montreal to Lachine will be completed by Jan. 1. The agreement with the Lachine Council calls for completion in November, but an extension of time was allowed. The line may be extended to Dorval and St. Ann's in the spring.

Newton, Bucks County, Pa.—The Newton Electric Railway Co. has been incorporated with a capital stock of \$100,000 to build four miles of electric road in and about Newton. Among the incorporators are: Thomas P. Chambers, George C. Worstall, James C. Hutchison, Alexander Chambers and Ashbel W. Watson, all of Newton. The road will be about four miles long, beginning on State street, Newton, and extending out on the Bridgeton and Newton pikes to Bridgeton, and over the Newton and Bristol road to the south line of the right of way of the Trenton cut-off of the Pennsylvania Railroad. There will also be lines on a number of streets in Newton.

New York.—After a conference that lasted two days the Directors of the Metropolitan Traction Company authorized President Vreeland on Dec. 22 to give the contracts for the apparatus to be used on the underground electric conduit road on Fourth and Sixth avenues. Work will begin as early as possible in the spring.

Peoria, Ill.—The Glen Oak & Prospect Heights Railroad will be a fraction over six miles long, 4½ of which will be in the city, and the remaining length reaching Prospect Heights, a popular summer resort. The apparatus will consist of 10 27-ft. cars mounted on McGuire trucks, with double 30-H. P. Westinghouse motor. Sixty seven-pound, 60-ft. girder and T rails will be used. The construction throughout will be the best that the contractors, The Electrical Installation Co., of Chicago, can furnish.

Pittsburgh, Pa.—New rails are being laid by the Consolidated Traction Co. from Pittsburgh to Mill-

vale, and it is expected that this double track line will be ready for operation by the middle of next month.

The Birmingham Traction Co. has a large force of men at work building an electric line to Arlington Heights, to be known as the Arlington Avenue Branch.

Portland, Conn.—A petition has been filed to the General Assembly for the incorporation of the Portland & East Hampton Street Railway Co., to run through Portland and the village of Chatham on the public roads and across private lands.

Rockville, Conn.—The Hartford, Manchester & Rockville Tramway Co. will petition the General Assembly this winter for an amendment to its charter authorizing it to build its line through some of the principal streets in Rockville and Vernon.

Roseland, B. C.—A charter has been granted to the British Columbia Tunneling & Developing Co., Ltd., to construct a tunnel through Red Mountain of sufficient width and height to enable the company to lay double tracks for electric cars to convey the ore from the mines.

Torrington, Conn.—A petition has been sent to the General Assembly for a charter for an electric road between Torrington and Winsted, a distance of about 10 miles, and for an extension to Highland Lake, making a total distance of 20 miles.

Washington, D. C.—Work on the line of the Columbia & Maryland Electric Road has again commenced at a point near Washington, and the work of laying the track within the District of Columbia, about four miles, will be rapidly carried on, in order to comply with the charter of the company which requires that the road shall be in operation in the District by March 2, 1897.

A bill has been introduced in Congress by the Metropolitan Railway Co. to extend its underground electric road for several miles along Columbia street, beginning at the intersection of Connecticut and Florida avenues. The bill provides that the work shall be completed within six months from the passage of the bill, and also authorizes an increase of capital stock of \$250,000 to meet the expenses of this additional construction.

West Orange, N. J.—The South Orange & Maplewood Trolley Railroad Co. has petitioned for a franchise to continue its line from Montrose avenue to the Erie Railroad at Main street.

GENERAL RAILROAD NEWS

Atlanta & West Point.—A suit was filed in the State Court at Atlanta this week to wind up the affairs of the railroad, on the ground that its charter expired on December 20, and that its assets are a trust fund for the benefit of its creditors and shareholders. The petition asks for the appointment of a Receiver, the sale of the property and the distribution of the proceeds to the creditors and shareholders.

Baltimore & Ohio.—The Baltimore Reorganization Committee has undertaken to prepare a new report of the accounts of this company. It is to be based on the recent report of Mr. Little, and another report prepared in 1888 by Mr. H. D. Bulkley, the present Comptroller of the road, which has never been published. A copy of this report has been obtained by the Baltimore Reorganization Committee, and it is stated criticises the book-keeping methods used at the time it was made. Mr. Bulkley's investigation is said to have covered about 10 years prior to 1888, thus including not only the administration of Mr. Robert Garrett, but extending into that of the late John W. Garrett.

Boston Terminal Co.—The Massachusetts Railroad Commissioners have granted authority to the directors to issue an additional \$2,000,000 of 50-year four per cent. bonds for the purpose of acquiring and preparing land for the new station. It may now be expected that active operations in clearing the way for the building and trackage in connection with the terminal will be inaugurated within the next two weeks.

Catawissa.—At a meeting of the stockholders at Philadelphia last week, it was decided by an almost unanimous vote to execute a new lease with the Philadelphia & Reading, under the terms of which the rental hereafter is to be definitely fixed at the interest on the bonds, including any tax thereon which the Catawissa Company may be liable to pay, and a sum sufficient to pay a 5 per cent. dividend clear of taxes on the entire issues of preferred stock, together with \$8,000 per annum for organization expenses, the present percentage arrangement to be cancelled, and any profit or loss over the fixed rental, as above, to go to or be borne by the Reading Company.

Chicago & West Michigan.—It is announced that after Jan. 1 this road, which operates a line between New Buffalo and La Crosse, Ind., will be known as the Detroit & Grand Rapids Railroad. This road is part of the Detroit, Lansing & Northern, which was recently reorganized under the name of the Detroit & Grand Rapids. The two lines have been operated separately by the same officers.

Hidalgo.—The Mexican Herald prints a report that an American syndicate has purchased the Hidalgo Railroad for \$2,500,000 gold. The line is a narrow gauge and extends from the City of Mexico to Pacahua. It is proposed by the new owners to extend the line down to the coast to Tuxpan. The line is a valuable one, and an extension will take it through a fertile region.

Kansas City & Northwestern.—This road, a branch of the St. Louis & San Francisco Railroad, was sold last week at Winfield, Kan., to E. C. Henderson, General Counsel of the St. Louis & San Francisco, for \$200,000. The road is 61 miles long, and extends from Beaumont to Cale, Kan.

Long Island.—The company has arranged with Redmond, Kerr & Co., of New York, to take its new issue of \$500,000, 5 per cent. bonds on the New York & Manhattan Beach road, which replace an equal amount of bonds expiring Jan. 1.

Louisville, Evansville & St. Louis.—On Dec. 15 the receiver ceased operating the branch, 23 miles in length, which extends from Lincoln City to Cannellton, Ind.

Manhattan.—A small bondholder of the company has asked the Attorney-General of New York state to begin proceedings to prevent the payment of dividends on this company's stock. The movement does not appear to be one of any consequence, and whether the bondholder represents anyone but himself does not so far appear. The Attorney-General has taken no action in the matter. The ground for the application is that dividends have been paid out of surplus, and have not been earned.

Northern Pacific.—The company began on Sept. 1 the operation of the entire system, including the St. Paul & Northern Pacific and other lines heretofore leased and

now owned, as a single property, and now reports the following results which are made up on the reorganized basis:

	September.	October.
Gross earn.....	\$1,833,177	\$2,498,834
Oper. expen.....	1,045,247	1,065,192
Net earn.....	\$787,930	\$1,433,642
Taxes, rentals, etc.....	49,259	49,259
Oper. income.....	\$738,671	\$1,384,383
Miscel. income, not including land sales.....	20,222	14,431
Total net income.....	\$758,893	\$1,398,814

The operating expenses for each month include a proportionate part of the estimated taxes and rail and tie renewals for the current year of the new company from Sept. 1 last to July 1, 1897.

Philadelphia & Reading.—A special meeting of the stockholders of the Reading Company, which is the successor of the old National Company, whose charter has been used to effect a reorganization of the property, was held in Philadelphia, Dec. 18, at which the stock was increased from \$40,000,000 to \$140,000,000. This company is the controlling corporation through which the railroad and coal and iron properties are operated.

The Attorney-General of Pennsylvania heard arguments last week at Harrisburg by the attorneys of the new company on the validity of the charter of the National Company, which, as stated above, has been succeeded by the Reading Company. He had previously given notification that he would officially investigate the validity of this charter for the purposes for which it is now used. The attorneys asserted that the National Company had maintained a bona fide and active existence since it was incorporated in 1874 in building railroads and in other ways.

Pittsburgh, Bessemer & Lake Erie.—The directors of the Pittsburgh, Shenango & Lake Erie met Dec. 22 and formally authorized the consolidation of the road with the Butler & Pittsburgh. The new road will be called the Pittsburgh, Bessemer & Lake Erie, and will extend from Conneaut, O., and Erie, Pa., to Pittsburgh, with several branches.

Electric Railroad News.

Baltimore, Md.—A semi-annual dividend of 5 per cent., payable Jan. 2, has been declared by the City Passenger Railway Co.

Bridgeton, N. J.—The property of the South Jersey Traction Co., including the stocks of the corporations which it owns, is advertised to be sold at foreclosure on Saturday, Jan. 16, 1897.

Chattanooga, Tenn.—The Chattanooga Electric Railway Co. was reorganized Dec. 17 and the following officers were elected: J. H. Warner, President; Edward Warner, Vice-President; Warner McCall, Superintendent, and E. A. Lilly, Secretary and Treasurer.

Chicago.—The Suburban Railroad Co. has been reorganized with the following directors: C. H. Crossette, S. B. Shope, D. B. Lyman, H. K. Gulpin and Hubert Holcomb. The road was organized in 1895 with a capital stock of \$1,500,000 to build 35 miles of tracks, but only five miles has been completed. C. H. Crossette is President and H. K. Calpin is Secretary of the company.

Cincinnati.—A syndicate has been formed in Cincinnati to take up \$500,000 second mortgage bonds of the Cincinnati, Newport & Covington Street Railway Co., subject to ratification by the stockholders. The company has 60 miles of track and is capitalized at \$4,000,000, of which three-fourths is paid up.

Defiance, O.—On Dec. 18 Walter R. Faber was appointed Receiver of the Defiance Light & Railway Co. on application of W. M. P. Hunton, of Philadelphia. The capital stock of the company is \$100,000; par value, \$100 per share, and the funded debt is also \$100,000.

Dover, N. H.—On Dec. 15, Hon. W. S. Cobb, of Rockland, Me., representing a syndicate of New Hampshire and Maine men, purchased the property of the Consolidated Light & Power Co., of Dover, which has been in the hands of a Receiver for several years, for \$200,000. The new organization has applied to the Secretary of State for incorporation.

Gloucester, Mass.—The Gloucester, Essex & Beverly Street Railway Co. has mortgaged its property to the American Loan & Trust Co. of Boston, in order to secure an issue of bonds to the amount of \$125,000 at a rate of 5 per cent. a year interest, payable in gold coin.

Hamilton, Ont.—Mr. MacKenzie and Mr. B. B. Osler, of the Toronto Street Railroad, are at the head of a syndicate formed for the purpose of purchasing the various electric roads running out of Hamilton, and also the Hamilton Street Railway.

Hartford, Conn.—The State Railroad Commissioners of Connecticut have ordered that all the electric street railroads within the city limits of Hartford shall provide fenders for their cars by March 3, 1897. The General Assembly of 1895 provided that where the matter had been given due hearing the Commissioners could thus compel a street railroad to use fenders.

Newark, N. J.—The Union Traction Co. secured rights of way between Newark and Hackensack some time ago, and has now sold all the main lines in Essex, Hudson and Union counties to the Consolidated Traction Co. for \$250,000.

New Brighton, S. I., N. Y.—At a meeting of the Board of Trustees, held Dec. 15, the franchise formerly given to the Staten Island Electric Railroad Co. was revoked and given to the Staten Island Midland Railroad Co. The former company has laid about one-half of a mile of track on Castleton avenue, New Brighton. On Dec. 19 an injunction issued by Justice Barnard, of the Supreme Court, was served by the Midland Railroad Co. on the officials of the Staten Island Electric Railroad, forbidding them doing any further work on Castleton avenue, New Brighton. This leaves the matter entirely in the courts.

New Haven, Conn.—The electric locomotive to be used by the Manufacturers' Street Railroad has arrived in New Haven from the works of the General Electric Co., and will be placed in operation in a short time. The locomotive is similar in design to those made for the tunnel at Baltimore.

Scranton, Pa.—On Dec. 18 the Valley Passenger Railway Co., the Scranton Suburban Railway Co., and the former People's Street Railway Co., now known as the Scranton Railway Co., were consolidated under the name of the Scranton Railway Co. At the same time an agreement was made by which, after Jan. 1 next,

the Scranton Railway Co. will operate the different lines now operated by the Scranton Traction Co. The directors of the consolidated company are: Clarence M. Clark, President; J. P. Hiley, Vice-President; C. Ford Stevens, Secretary and Treasurer; E. W. Clark, Jr., all of Philadelphia; Timothy Burke, Frank Silliman, Jr., and Horace E. Hand, Directors, Scranton. The capital stock of the new company will be \$2,500,000, divided into shares at the par value of \$50. The capital stock of the old companies which form this consolidation was as follows: Valley Passenger Railway Co., \$660,000; Scranton Passenger Railway Co., \$100,000; Dunmore Street Railway Co., \$30,000; The Scranton Railway Co., \$600,000, and the Scranton Traction Co., \$2,000,000. There will be no change under the consolidation in the local management of the roads.

TRAFFIC.

Traffic Notes.

The Georgia Legislature has rejected a bill proposing to compel the railroad companies to carry bicycles in baggage cars free.

The Illinois Central has made a reduction of over one hour in the time of its principal through train between Chicago & New Orleans.

The Seaboard Air Line has filed a second complaint with the Railroad Commissioners of the states through which it runs. This one charges the Southern Passenger Association with discrimination, in refusing to grant through rates and through car privileges to Arkansas and Texas. The presentation of this complaint to the State Commissioners appears to be for moral effect, a request being appended that the matter be carried by the state officials to the Interstate Commerce Commission.

The Board of Control of the Joint Traffic Association met in New York, Dec. 18, 28 roads being represented. The conditions under which the Canadian Pacific joined the association were approved by the Board. The other outside roads which the board has been trying to induce to come in, seem to remain in the same attitude as at first. The Commissioner reports that the Board of Managers, during the 12 months that the association has been in operation, have dealt with about 3,000 subjects, and that no decision of the Managers has been carried to the Board of Arbitration. The Clover Leaf injunction matter will probably not come up in the Ohio court until Jan. 5.

Chicago Traffic Matters.

CHICAGO, Dec. 23, 1896.

The week in railroad circles has been marked chiefly by a chain of events which has resulted in the establishment of much better passenger service to the south than has ever before been given. The Chicago & Eastern Illinois started the ball moving. It entered into a traffic arrangement with the Louisville & Nashville under which it runs a through sleeper from this city to New Orleans and another to Atlanta. The Illinois Central lost no time and last Sunday quickened the time of its New Orleans train to 26 hours. This is the fastest running time ever made between Chicago and the South. The passenger service from Chicago to New Orleans has been improved in other ways and the tide of winter tourist business seems to be setting toward California and the Southwest. Several severe winter storms in the Southeast have injured that district from a tourist standpoint, while California has been advancing in favor.

John Sebastian, General Passenger Agent of the Rock Island, has given out samples of a new round-trip ticket which is especially available for large excursions like the Grand Army encampment and the Y. P. S. C. E. The feature of the ticket is that the purchaser gets only the going portion, the return coupon being sent to the joint agent at the other end. The purchaser gets a receipt entitling him to the return portion on application to the joint agent. Other protective features make the ticket one which the broker would be very slow to deal in, if he touched it at all.

Western lines are trying to form a side agreement for the purpose of restricting advertising. It is proposed to de away entirely with advertising in theater programs, publications of societies, baseball programmes, picnic bills and so forth. It is hoped thereby to save some money and also to do away with a frequent method of cutting rates.

Local ticket brokers are beginning to be uneasy. It is said to be almost an impossibility to purchase any mileage of Western roads' issue in a broker's office, and there remains very little in which scalpers can deal. A few days ago they met and talked the matter over, forming an organization for mutual protection, for the advancement of their business and for "maintenance of rates."

Eastern lines have completed arrangements for putting their 5,000-mile interchangeable mileage book on the market Jan. 2. The new book will be good over 39 roads. All the big Eastern trunk lines except the Erie, Grand Trunk, Michigan Central and the Big Four are included. It is expected that there will be a big demand for the book, as there have already been many inquiries concerning it. The clerical ticket bureau of the Eastern lines will begin operations Jan. 2.

Western lines are very much incensed over the refusal of the Joint Traffic managers to allow the lines of that organization to join with the Chicago-St. Paul lines in meeting the competition of the Canadian Pacific in selling holiday excursion tickets, with three months' limit, from Minneapolis and St. Paul to points in New England.

Total eastbound shipments, all rail, last week were 63,330 tons, as compared with 58,357 for the preceding week, and 90,577 for the corresponding period of 1895. Lake shipments aggregated 4,916 tons. The all rail traffic was carried by the different roads in the following proportions:

Roads.	WEEK TO DEC. 19.		WEEK TO DEC. 12.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central.....	7,092	11.2	5,560	9.5
Wabash.....	5,675	9.0	4,873	8.4
L. S. & M. S.....	8,441	13.3	8,197	14.1
Pitts., Ft. Wayne & Chicago.....	6,261	9.8	5,736	9.8
Pitts., Cin., Chi. & St. Louis.....	6,049	9.6	7,077	12.1
Baltimore & Ohio.....	6,666	10.5	5,712	9.8
Chicago & Grand Trunk.....	7,343	11.6	6,242	10.7
N. Y. C. & St. L.....	5,392	8.5	4,842	8.3
Chicago & Erie.....	7,643	12.1	7,318	12.5
C., C. & St. Louis.....	2,768	4.4	2,800	4.8
Totals.....	63,330	100.0	58,357	100.0

